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An Analysis of the Accuracy and Determinants of Earnings Forecasts of Companies Listing on the Alternative Exchange of South Africa

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Half thesis

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Declaration

I, Lisa Levinson, hereby declare that this study is my own original work and that all references have been duly acknowledged.

I further declare that this thesis in part or in its entirety has not been submitted to any other University for degree purposes or any other educational purposes.

University of Cape Town

Abstract

This study analyses earnings forecast accuracy and bias, and the determinants of earnings forecast accuracy, for firms listed on the Alternative Exchange (AltX) in South Africa. The data includes 67 firms listing on the AltX from its inception in 2003 to 2009. It is mandatory for firms listing on the AltX to submit an earnings forecast for the two first years in their initial public offering (IPO) prospectus.

The accuracy and bias is derived from measuring forecast errors, absolute forecast errors and square forecast errors. The results show that AltX firms underestimate the earnings for the first year by 6.61% and overestimate the earnings for the second year by 33.6%. The forecast accuracy error is 43.4% for the first year and 103% for the second year.

Possible determinants of earnings forecast accuracy are tested in a regression analysis. The results show that leverage is a significant determinant. The lower level of debt, the higher earnings forecast accuracy.

Table of Contents

Declaration	1
Abstract	2
1 Introduction	5
1.1 Background	5
1.2 Research Questions	5
1.3 Contribution	6
1.4 Outline	6
2 Literature Review	8
2.1 Background to IPOs	8
2.1.3 Trends in IPOs	11
2.1.4 Underpricing	12
2.2 The South African Context	13
2.2.1 The AltX	13
2.3 The IPO Process	14
2.3.1 The IPO Prospectus	15
2.4 Earnings Forecast	16
2.4.1 Signalling Theory of Earnings Forecasts	17
2.4.2 Why Earnings Forecasts are Important	23
2.5 Earnings Forecast Accuracy and Bias	25
2.5.1 How to Measure Forecast Accuracy and Bias	25
2.5.2 Previous Studies of Earnings Forecast Accuracy and Bias	28
2.5.3 Determinants of Earnings Forecast Accuracy	31
2.5.4 Motivations for High Level of Accuracy	40
3 Methodology	46
3.1 Research Design	46
3.1.1 Sample	46
3.1.2 Data	47
3.2 Hypotheses and Tests	48
3.2.1 Earnings Forecast Accuracy and Bias	48
3.2.2 Determinants of Earnings Forecast Accuracy	48
3.3 Evaluation of Study	55
3.3.1 Validity	56
	3

3.3.2 Reliability	56
3.3.3 Demarcation	57
4 Findings and Results	58
4.1 Descriptive Statistics	58
4.2 Test of Earnings Forecast Accuracy and Bias.....	59
4.3 Test of Determinants of Earnings Forecast Accuracy.....	63
4.3.1 Parametric and Non-Parametric Test of Binary Variables.....	64
4.3.2 Regression of Earnings Forecast Accuracy for Year One.....	65
4.3.3 Regression of Earnings Forecast Accuracy for Year Two	68
5 Conclusions	71
Bibliography.....	75
Appendix	81
1 Listing Requirements	81
2 Residual Analysis	82

1 Introduction

1.1 Background

In 2003 the Johannesburg Stock Exchange launched an alternative stock exchange, to be known as the AltX. This new exchange is marketed to young, small and risky companies that are not yet ready to list on the main board. Some of these companies have limited operating histories but a sizable number of companies have been operating for many years, which makes the AltX different to other exchanges set up for start-ups. To assist investors the prospective AltX companies are required to submit a two year earnings forecast.

In early 1970 studies started to look into management earnings forecasts (Sun & Liu, 2009) and how well their predictions were realised. During that time the first study examining initial public offering (IPO) earnings forecasts were performed in the UK (Dev & Webb, 1972). The study did not only analyse the accuracy of earnings forecasts, but also identified possible determinants (Jaggi, 1997).

Since then, numerous studies have examined earnings forecast accuracy from different perspectives. More than a dozen countries that have either compulsory or voluntary submission of earnings forecast have been studied. Many of them are developed countries. In 1998, Jelic, Saadouni & Briston stated that “*there is a paucity of research on earnings forecasts in emerging markets*”. In 2011 this still holds true.

This study contributes, in general, to the body of academic literature regarding the analysis of earnings forecast bias, and earnings forecast accuracy and its determinants. It also contributes to the research on emerging markets, and more specifically to the knowledge of the alternative exchange in South Africa.

1.2 Research Questions

This study aims to answer two research questions:

1. What is the earnings forecast accuracy, and bias, for AltX listed companies?
2. What are the determinants of earnings forecast accuracy for AltX listed companies?

The study includes almost all companies that are, or have been, directly listed onto the AltX.

1.3 Contribution

This study aims to contribute to the academic literature by analysing earnings forecast accuracy in the South African context. Within the area of IPOs there are many studies that have explored the level of earnings forecast accuracy and bias. There are numerous studies that have investigated the determinants of earnings forecast accuracy. However, there is only one study, to my knowledge, that analysed earnings forecast bias in South Africa. That study encompasses the main board for the years 1994-2001 (Mbuthia, 2003). This study is likely to be the first to examine the earnings forecast bias, and accuracy and its determinants, for the AltX.

With South Africa being a developing country this study also aims to add to the body of forecast accuracy literature from emerging markets. This study is also unique, as far as I know, since it looks at an alternative stock exchange for young, small and risky firms, in an emerging market.

Investors should find the findings of this study useful. The study highlights the importance of soliciting information from numerous sources before making an investment decision. It also presents determinants of earnings forecast accuracy for AltX listed companies; information that can be of value to investors.

The AltX is a relatively young stock exchange and this study's findings might provide the JSE and South African regulatory authorities with information regarding the current level of earnings forecast accuracy and its drivers; information that can aid the work in developing a mechanism to protect the integrity of the exchange in regard to future listings.

1.4 Outline

The report is divided into three parts. Firstly, the literature review examines the research undertaken in this area to date. The second part refers to the methodology employed in the study. Thirdly is a presentation of the results of the study and the subsequent conclusions.

The expression of *earnings forecast accuracy* is used throughout the report as an expression for both earnings forecast accuracy and earnings forecast bias. This is a widespread practise in the academic literature. When presenting the results of the study they are separated as a consequence of being measured in different ways.

2 Literature Review

Prior to providing an extensive review of the studies undertaken on earnings forecasts, this study provides an introduction to the IPO process as well as a background to the AltX.

2.1 Background to IPOs

The first time a company offers ownership in the company to public investors they perform an IPO. An IPO is a major event in the life of a corporation. It is a restructuring of ownership where the company's shares can change owners more easily through a securities exchange. It is a way for current owners to realise the monetary value of their ownership. The previous owners also partly or completely relinquish control over the company to a board representing all the shareholders. An IPO is also a way to raise capital now, and in the future, to meet the financing requirements of the firm. The process of introducing a company to the stock market creates a considerable amount of attention for a company; there is more scrutiny both through the increased awareness but also through greater legal reporting requirements.

The first issuing and selling of shares are done in the primary market, usually through the aid of investment banks. Once the shares are listed then trades occur on the secondary market i.e. the stock exchange. "An IPO represents a critical transition point in the firm's development, as this undertaking moves the firm from the private arena to the public arena." (Certo, Daily & Dalton, 2001)

The first issuing of corporate stocks was for the Dutch East India Company in 1602 on the Amsterdam Stock Exchange (Magliolo, 2004). The secondary market was created in 1688 when already issued stocks started trading on the London Stock Exchange. The reason for issuing shares in the Dutch East India Company was to raise capital to finance the costly business of constructing and operating ships importing goods from Asia. Raising capital to finance corporate endeavours is still the main reason for IPOs. There are several ways for a company to raise capital. In relation to capital structure theory, particularly the pecking order theory of capital structure, firms will firstly use internal financing, then issue debt and finally will issue equity to raise the required funds to finance an expansion in operations. (Myers & Majluf, 1984)

An IPO opens up the possibility to access capital at the time of listing, but also at subsequent equity issues. Raising capital through the equity market creates an incentive for management to increase the market value of the company, and subsequently the share price, in order to maximise the accessible capital. Raising capital is the primary reason for an IPO (Ritter & Welch, 2002). Research has also confirmed that IPOs are more frequent for firms with growth prospects, see for example (Pagano, Panetta & Zingales, 1998) in (Helwege & Liang, 2004), this indicates that raising fund to enable expansion is a central function of an IPO.

An IPO is also a way of unlocking the owners' wealth. Liquefying a corporate stake can be difficult for the shareholders of a private company. There are several factors that exacerbate the difficulties. There is often an absence of an active liquid market with buyers, sellers and price setting mechanisms. Buying a business is highly complex due to information asymmetry, capital requirements et cetera. By introducing the company to the stock market there is much greater liquidity and there is a clear price set by the market for every ownership stake. For venture capital firms an IPO is often an exit strategy ((Helwege & Liang, 2004) referring to their previous findings). An IPO can also be a part of an incentive scheme where management and employees are awarded share options to align their interest with the welfare of the company. In a South African context the transfer of ownership stakes is a current topic due to the focus on black economic empowerment (BEE) plan.

Going public increases the potential for mergers and acquisitions, since "it is much easier for a potential acquirer to spot a potential takeover target when it is public" ((Zingales, 1995) summarised by (Ritter & Welch, 2002)). An investor is more likely to receive a higher price for his/her ownership stake if it is traded through a public arena, seeing as it is easier for an acquirer to negotiate a discount with the entrepreneur than it is trying to employ the same tactic in a publicly traded market where the counterparty represents numerous individual investors (Ritter & Welch, 2002). Moreover, in the private market acquirers will pay less for an ownership stake since they are unable to diversify their holdings due to the size of every individual investment (Chemmanur & Fulghieri, 1999). However, the stock exchange rewards the highest bidder and not necessarily the best suited owner in the eyes of management. This can lead to take over situations where the entrepreneurs find themselves losing control over the company they created.

Companies undertaking an IPO are often exposed to scrutiny by financial analysts, media and investors. This creates a considerable amount of attention for the company. For many companies this is their first time in the limelight. It is the first time they share their business idea and future prospects to an interested audience. This attention can be of great value, and can be of use in strengthening overall brand awareness both among potential investors and among potential customers and employees. Undertaking an IPO can "...inspire more faith in the firm from other investors, customers, creditors, and suppliers." (Ritter & Welch, 2002)

Being listed also entails loss of informational privacy. Information regarding the financial position and operating margins has to be disclosed at regular intervals. Companies that previously operated in relative secrecy now have to disclose the exact remuneration of managers, levels of debt, sales growth and margins and other data points that can be sensitive due to competitive reasons.

Being a public firm is time and resource intensive, especially on a managerial level, particularly for small firms. Redirecting resources from operations and business development can be detrimental for a company in its growth stage where resources are limited. Financially, it is expensive for a company to go public. The direct cost includes advisory fees and listings fees. These advisory fees are both a once off cost at the time of the listing, and an ongoing expense since the exchange requires constant disclosure of information. Then there is the annual listing fee to the stock exchange. (Draho, 2004) For AltX this amounts to R22,000 per annum (see appendix 1).

Publicly traded companies are also required to file financial reports with a high frequency. The content of the reports is considered by the actors on the equity market and consequently reflected in the traded price. The impact on the share price will make management acutely aware of the judgment of their performance. It involves not only their past performance; future prospects, strategies, but random rumours are taken into consideration. There is a risk that management gets blindsided by the short term reactions of the share market and may make decisions based on share price considerations rather than pursuing a long term sustainable strategy.

Companies can also undertake IPOs to alter their capital structure. The choice of capital structure is a strategic matter for companies. Highly geared companies are burdened with high fixed financing costs and pressures such as expiry dates and covenants. This may negatively affect profitability, risk and may place constraints on flexibility. By issuing equity, debt can be paid off and the capital structure shifts to a target range.

2.1.3 Trends in IPOs

The goal of an IPO is to raise as much money as possible. Firms choose to go public when they are favourably valued and can set a high IPO price. It is believed that this creates what is referred to as hot and cold periods in the IPO market. A hot IPO period entails a large concentration of IPOs and a large degree of underpricing (see next section for a description of underpricing).

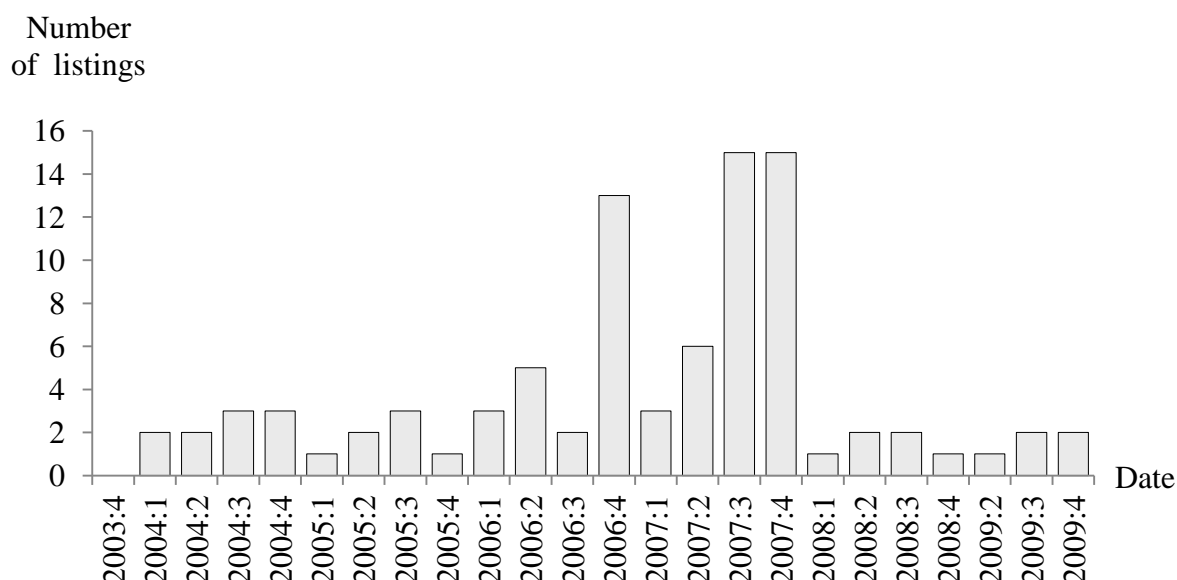
The main reason for hot periods is an optimistic investor sentiment. When investors are overly optimistic they give more favourable valuations, which results in an opportunity for the issuing firm to demand a high IPO price. Firms considering going public try to time the IPO to coincide with the window of opportunity that a hot IPO period provides. (Ritter & Welch, 2002)

It has been suggested that information spillover is an important part of hot IPO periods (Draho, 2004). When an investor considers investing in a new company in a new industry it implies an effort that the investor discounts from the price he/she is willing to pay. The first company in an industry to be listed will therefore have a lower IPO price than its followers. The first company also sets the industry valuation standard. When the valuation is high in an industry many companies are likely to follow. This creates industry concentration in IPOs. This phenomenon was thought to drive hot periods. This was dismissed by (Helwege & Liang, 2004) who found the same industry concentrations in cold periods. Instead they concluded that hot periods are “not driven primarily by changes in adverse selection costs, managerial opportunism, or technological innovation, but more likely reflect greater investor optimism.” (Helwege & Liang, 2004)

The conclusion can be drawn, from an ocular analysis, that the AltX had two hot periods (see figure 1). In the first hot period, October to December in 2006, 13 companies were listed.

During that period the number of companies that listed on the AltX grew by almost 50%. The next hot period was from July to December 2007, when 30 companies listed growing the exchange by an impressive 61%:

Figure 1 The Quarterly Number of Listings on the AltX 2003-2009 (JSE 2010e)



2.1.4 Underpricing

It is impossible to perform a study on IPOs without mentioning underpricing. The practice of issuing shares at a discount, and consequently achieving a high first day return, is so common that “Academics use the terms first-day returns and underpricing interchangeably.” (Ritter & Welch, 2002). In a study including over six thousand IPOs (Ritter & Welch, 2002) found that the first day return was on average 16%. Seven out of ten IPOs are underpriced and this is the practice in all countries where studies have been made.

Correia & Holman (2008) found that the large number of listings on the AltX in 2006 and 2007 was not reflected in higher levels of underpricing. The study found that the average first day return amounted to 29%.

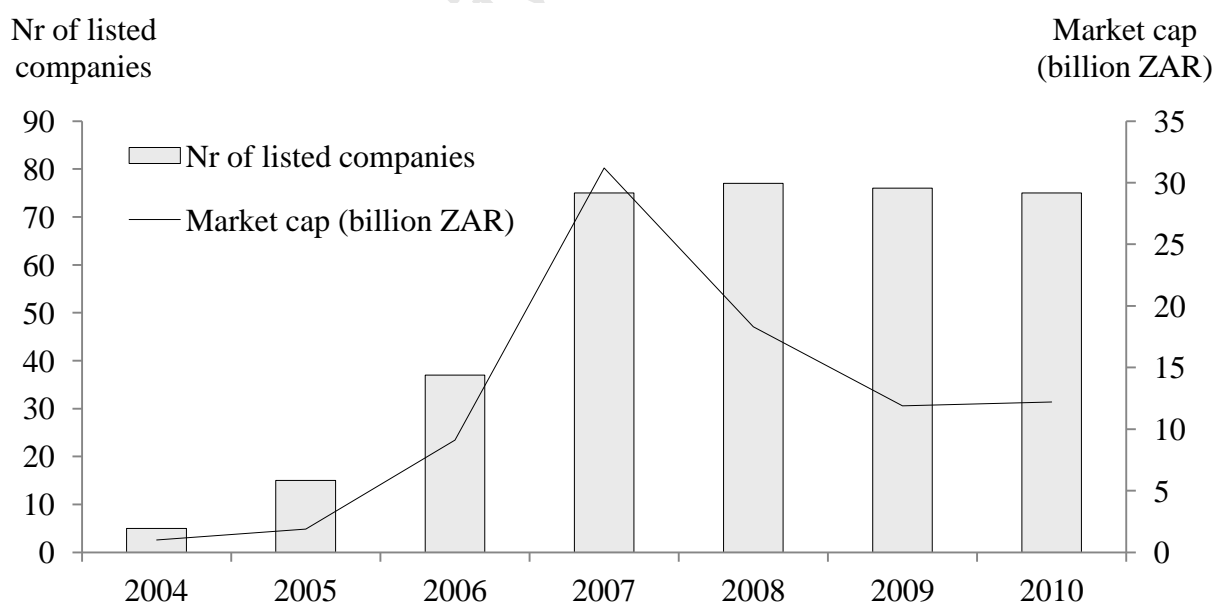
2.2 The South African Context

2.2.1 The AltX

In October 2003 the Alternative Exchange of South Africa (AltX) was launched as an alternative public equity exchange to the already established JSE Securities Exchange main board. AltX is a fully owned subsidiary of JSE and is aimed toward companies that are “too small or too new to list on the main board of the Johannesburg Stock Exchange” (Itano, 2004). The AltX was started in cooperation with the South African Department of Trade and Industry (DTI). Apart from supporting small or new companies, the AltX is also created to especially support black economic empowerment (BEE) companies. Another important driver is to avoid capital flight to international exchanges, such as AIM in the UK that already offer a platform for small and new companies to obtain equity financing (Magliolo, 2004).

Almost eight years later in January 2011 there are 68 companies listed on the AltX. The combined market cap of AltX in 2010 amounted to R12.2 billion (Moneyweb, 2010). The AltX comprises companies from many industries but construction and related sectors form an important component.

Figure 2 The Number of Listed Companies and the Market Cap of AltX 2004-2010



The significant decline in the market capitalisation of the AltX and low returns have forced Noah Greenhill, marketing and business development manager at AltX, to admit that he is “looking at the regulations but is not going to make changes just yet.” (Claasen, 2010) Others

are more positive and state that the 52% index decline is misleading since the fastest growing and most successful companies are quickly transferred to the main board (McLachlan, 2010). Since inception, 13 companies have been transferred to the main board.

2.3 The IPO Process

Going public is an intensive formalised process for a company. It starts out with selecting advisors and in South Africa also a sponsor known as a “designated advisor”. There are 16 authorised companies with 69 designated advisors that assist companies in the IPO process (JSE, 2010a). The advisor then ensures that the company meets the listings requirements of JSE (see appendix 1).

Once the IPO decision is made there are several activities that commence. There are many strategic decisions to be made, information gathered, and documents to be filed. Some companies choose to work with an underwriter that either guarantees that the capital will be raised through a firm commitment, or commits to making a best effort but without guarantee that the funds will be raised. There can also be legal advisors, accountants and public relations consultants involved. Marketing and regulatory material is put together and management go on a road show to present the company to potential investors. Depending on the type of IPO the shares are then allotted to the interested investors. A final IPO price is set and the company is listed and the firm’s shares commence trading. For a company listing on the AltX the IPO process normally takes 10 weeks (Magliolo, 2004). One important part of the IPO process for the AltX is that half of the shares belonging to the directors must be held by a third party in trust. Once the remainder of the financial year of listing has passed half the trust is released, the rest is released the following year.

Methods of Listing for the AltX

When a company has made the decision to go public there are several methods to obtain a listing (JSE, 2010c). They can either do a front door or a back door introduction to the stock market:

- Front door methods are:

Introduction which is a viable option when a company already has a large number of owners and do not seek to raise capital but merely obtain access to a market where the ownership shares can be traded. This is not very common for

companies listing on the AltX, and less than a handful companies have selected this method.

Public offer is the method which is most commonly associated with IPOs. Shares are offered to the public on a primary market. The interested investors buy the issued shares and the proceeds of the sales go to the issuing company.

Private placing is when the shares are offered to selected investors, primarily financial institutions and related entities. The accruals of the sales are transferred to the issuing company. This is the dominant method of listing on the AltX.

- Back door methods are:

Cash shell is a listed disassembled company with the positive traits of being listed and having cash. For unlisted companies this can be a vehicle to go public through the cash shell acquiring the unlisted company

Reverse takeover is when a listed company acquires an unlisted company and issues additional shares as payment. This has occurred only three times since AltX's inception.

In addition these means of listing can be combined with a secondary listing where the companies are already traded on another stock exchange. Five companies have the AltX as their secondary listing.

The front door methods of being listed all demand that the company follows a certain process. This process includes submitting an IPO prospectus, including the preparation of earnings forecasts.

2.3.1 The IPO Prospectus

One of the most important parts of the marketing and regulatory material in the IPO process is the IPO prospectus. The purpose of the document is "...helping investors to make an informed investment decision regarding the company" (Magliolo, 2004). A substantial part of the information stated in the prospectus derives from a due diligence usually performed before the IPO decision is made. The document is legally binding and its content is regulated. All information that is submitted in the prospectus must be verifiable by the company.

The directors of the company are fully responsible for the content of the IPO prospectus. Regardless that the prospectus "...will largely be drafted by the corporate advisor, the directors of the company accept full responsibility for the accuracy of its content." (JSE, 2010b). The directors have to ensure that the prospectus information is not only correct and verifiable, but also contains a sufficient amount of information that is required both by the JSE listing requirements and South African corporate law. (JSE & DTI, 2010)

The Content of an IPO Prospectus

There are several requirements in terms of what an IPO prospectus should contain. The informational requirements differ from country to country, and exchange to exchange.

In the terms of the JSE requirements, there should be an introductory section describing the nature of the business. That section should contain general information regarding the business and the corporate and group activities. It should also provide specific information regarding the employment of capital. Another section should introduce the directors, management, and corporate advisors. This section should also present the directors remuneration. The prospectus needs to contain details on the securities on offer; a description of the deal structure and its terms and conditions. The prospectus should present detailed historical data on financial performance and position. The informational requirement differs from the main board to the alternative exchange since not all companies listing on the AltX have a history of past performance. Therefore it is required to provide an earnings forecast when listing on the AltX.

2.4 Earnings Forecast

An earnings forecast is a forward looking income statement that projects the company's future earnings on a summarised basis. The forecast often includes an estimation of revenue, operational profit, net profit before tax, and net profit after tax. The earnings forecast is accompanied by a statement of the main underlying assumptions that form the basis of the projections.

When listing on the AltX "The issuer must produce a profit forecast for the remainder of the financial year during which it will list and one full financial year thereafter..." (JSE & DTI, 2010). The forecast must include the assumptions that have the largest effect on the prospective earnings. To make it easier for investors to evaluate how sensitive the earnings

forecast is there are several stipulations regarding how the assumptions are stated (JSE, 2010d). The forecast is required to be audited or, if not, have a cautionary text attached to it.

Exemption is possible for dual listed companies that trade on another stock exchange. This is often stipulated by the regulations of the primary stock exchange e.g. “African Eagle is not permitted to issue forward-looking statements in terms of the provisions of the AIM market” (African Eagle Resources, 2007). There is also a possibility for exemption if “the applicant provides historical financial information for three years...” (JSE, 2010d). Companies that are transferring to AltX from the main board, venture capital board, or development capital board are not by required to submit an earnings forecast (JSE, 2010d). Overall, most companies listing on the AltX do submit an earnings forecast.

The profit forecast is the “sole responsibility of directors” (JSE, 2010d). However, the designated advisor must examine the forecast. The inspection can be *prima facie*, i.e. at first sight, which legally implies that the approval of the designated advisor need not be indisputable or conclusive.

2.4.1 Signalling Theory of Earnings Forecasts

There is an inherent information asymmetry when introducing a new company to the stock exchange. The current owners of the company have a greater knowledge of the company than the potential investors. The value of the investment is therefore dependent upon the signals that management send out (Chan and others, 1996). The management has to rely on several different signalling tools since “Firm executives’ claim that they manage a high-quality firm with excellent investment potential is unlikely to be sufficiently convincing to market participants” (Certo, Daily & Dalton, 2001).

There are two fundamental principles of signalling theory in regards to an IPO. Firstly, the signal that the company transmits has to be “observable” and “known in advance”. Secondly, high quality signals need to be hard, or costly, to imitate for a low quality company. (Certo, Daily & Dalton, 2001) There are numerous ways of signalling high quality, e.g.:

- Recruitment of prestigious board members (Jog & McConomy, 2003)
- Strong historical financial performance

- Final four auditing firm (Jog & McConomy, 2003)
- Share price based incentive programs (Jog & McConomy, 2003)
- Reputable underwriter
- Retention of shares by initial owners (Firth & Liao-Tan, 1997)
- Distribution of the raised funds

The main tool that management employs to transmit the above signals is the IPO prospectus (Daily and others, 2003), and one of the main sources of information therein is the earnings forecast. The inclusion of earnings forecast in the IPO prospectus will assist the investor in valuing the corporation and thereby pricing the share (Lonkani & Firth, 2005). An earnings forecast is an influential signalling tool (Firth, 1998). This is especially true for new companies with no historical financial data. Firth (1998) reach the conclusion that an earnings forecast has much greater impact on the valuation than factors such as retained ownership by the initial owners. Moreover, Kim & Ritter (1999) conclude that the signalling value of an earnings forecast is superior to that of historical financial statements.

The signalling theory states that corporations that want to signal high value should issue an earnings forecast if the forecasted numbers exceed the market's expectations. This is manifested in a study by Lev & Penman (1990) where managers indeed include earnings forecasts when they exceed the expectation of the market. It is also shown that managers are more prone to issue an earnings forecast when they find that the investors' analyses are considerably flawed (Hassell & Jennings, 1986). This phenomenon, where only positive information that exceeds expectations is published, is called the good news hypothesis (GNH) (Verrecchia, 1983). In accordance with the GNH Jog & McConomy (2003) and Clarkson and others (1992) showed that IPO firms that do include an earnings forecast are assumed to carry good news and are therefore rewarded with a higher IPO price.

If inclusion of an earnings forecast signals good news, then exclusion signals bad news. If an earnings forecast is omitted, then the market will assume that earnings are lower than expected. This puts a downward pressure on the IPO price and on the number of interested investors. A substantial number of corporations include the earnings forecast in order to avoid the negative consequences of not including an earnings forecast. (Chan and others, 1996)

Management have to balance the benefit of sharing information with potential investors with the cost of disclosing too much information. There is a direct cost to gathering and presenting data. There is also an indirect cost where customers, suppliers, and other stakeholders can use the information to argue for improved terms at the expense of the company. In addition competitors can use the information to position themselves better strategically (Chan and others, 1996). Furthermore, it could be of interest for a low quality company to create a high quality signal, e.g. recruit a prestigious board member, but this comes at a great cost, especially if the board member does not believe in the prospects of the IPO (Certo, Daily & Dalton, 2001). As stated by Jog & McConomy (2003) “Signalling literature is based on the notion that high quality issuers (sellers) have lower cost for their signalling activities.”

The issuance of an earnings forecast creates a benchmark to which the corporation's performance can be evaluated. This possibility of evaluation is a benefit to the investors but a risk to management since they put their reputation at stake. Subsequently, an earnings forecast can be seen as an implicit contract between the two parties (Cormier & Martinez, 2006).

Closely associated with the signalling theory is the theory of voluntary disclosure. The main principles are that voluntary disclosure comes at a cost, and the benefits of those disclosures must exceed that cost (Jog & McConomy, 2003). The theory also derives from the challenges of information asymmetry, but is more of a cost benefit analysis (Cormier & Martinez, 2006) than signalling theory. The theory body of voluntary disclosure is especially relevant in context where it is voluntary to include an earnings forecast.

Mandatory, Prohibited and Voluntary Disclosure of Earnings Forecast

An exchange can regulate earnings forecasts in IPO prospectus in three ways. Firstly, it can be mandatory like the AltX in South Africa, and the stock markets in China (Lau, 2004), Malaysia, Greece (Gounopoulos), and Thailand (Lonkani & Firth, 2005), and previously New Zealand. Secondly, issuance of earnings forecasts can be prohibited which is the situation in the US (Chong & Ho, 2007) and previously also in the UK. Thirdly, it can be voluntary like the stock markets in Australia, Canada, France, Hong Kong, Malaysia, New Zealand, Singapore, UK, and the main board of the JSE in South Africa.

Mandatory Disclosure

The system for mandatory inclusion of earnings forecast differs from exchange to exchange. Jelic, Saadouni & Briston (1998) states that in Malaysia earnings forecasts are mandatory and regulators tolerate only a 10% divergence from forecast. A bank guarantee and initial ownership retention guarantees the accuracy of the earnings forecast. The initial owners cannot sell any shares the first 12 months and can thereafter sell only 20% of their shareholding per year.

In Thailand the IPO investors are primarily individuals. This is a consequence of few large institutional investors and a ban against discrimination of smaller private investors when introducing a new company to the stock market. Subsequently the printed information material including earnings forecast is of great importance since there are few large sophisticated investors that can take the CFO out for an information-laden lunch (Lonkani & Firth, 2005).

On the AltX in South Africa earnings forecasts are mandatory. This is to improve the investors' knowledge about the companies and their markets. This is needed since companies are hypothetically allowed to list at inception with no historical financial data in a completely new market niche.

Prohibited Disclosure

In the UK and US earnings forecasts have been subject to legislation. Earnings forecasts in prospectuses were prohibited in the US until 1973 (Firth, 1998). It was also prohibited for Canadian companies to include an earnings forecast in their IPO prospectus up to 1982. (Jog & McConomy, 2003)

Clarkson and others (1992) states that "...inclusion of earnings forecast in the US has been 'almost non-existent'". This is a consequence of the American legal environment. The omittance of an earnings forecast is a way to minimize the litigation risk that could arise if the forecast turns out to be inaccurate (e.g. (Mak, 1996), (Li, 2009), and (Firth, 1998)). Moreover, according to a study by Firth (1998), written in the middle of the IT boom 1998, many of the American IPO firms lack historical operational or financial data and many are high risk IT start ups whose future is hard to foresee.

There are many studies that refer to the risk of litigation in the US, see for example (Li, 2009), (Jog & McConomy, 2003), and (Jelic, Saadouni & Briston, 1998). They all conclude that the absence of an earnings forecast is a consequence of legal risk and that this “has led to problems of insufficient information in prospectuses” (Li, 2009). The situation makes it difficult for an investor to make an informed investment decision. In 1995 the Securities Exchange Commission (SEC) created a safe harbour for reporting companies in order for them to make forward looking statements. However, this did not include IPO prospectuses since an IPO firm is not yet considered a reporting firm (Li, 2009). There is currently a discussion whether to extend that safe harbour rule to IPO firms (Jog & McConomy, 2003). This discussion received additional focus when many IT firms performed an IPO (Jelic, Saadouni & Briston, 1998). The USA needs increased protection for the issuer if they are going to have the courage to present an earnings forecast (Jog & McConomy, 2003).

Voluntary Disclosure

In a setting with voluntary disclosure of earnings forecasts the theories of signalling and voluntary disclosure will flourish. The practise of voluntary disclosure is especially widespread in Commonwealth countries.

Cormier & Martinez (2006) discuss Healy & Palepu (2001) hypotheses that there are six parameters that influence managements’ willingness to voluntarily disclose information. These factors are not unique to the decision to include an earnings forecast in the IPO prospectus; but apply to all voluntary information disclosure decisions. The factors are corporate control, capital market transactions, litigation risk, share based incentive programs, proprietary cost, and management capability.

- Undertaking an IPO entails the introduction of new owners that hold voting rights. This creates a risk that the new owners will exchange the current management. In order to mitigate that risk the management has an incentive to increase disclosure to justify any previous poor performance and to decrease the risk of a take over.
- Raising equity is a capital market transaction that results in increased voluntary disclosure starting six months before the issuing of shares (Lang & Lundholm, 2000). The increased information disclosure has a lowering effect on the cost of equity (Botosan, 1997).

- The risk of litigation affects the degree of voluntary disclosure especially in regards to earnings forecasts. It should be added that there is a difference in litigiousness in regards to the countries' legal systems. In general, common law environments, as in the US, will entail a larger risk for lawsuits than code law.
- Share based incentive programs can affect managements' willingness to disclose certain types of information especially when a benchmark price is set. Management has an incentive to disclose bad news and delay good news.
- Proprietary cost, or protection of competitive advantage, implies that companies are not willing to disclose information that may have a negative impact on their competitive advantage.
- Management capability is a hypothesis that states that good managers want to increase disclosure to demonstrate and display their talent.

Shi, Bilson & Powell (2008) state that there are in general many benefits of voluntary disclosure. The disclosing firm will enjoy decreased information asymmetry from the increased information distribution. Shi, Bilson & Powell (2008) also agrees with Cormier & Martinez (2006) that the cost of capital will decrease. There will be an increased trade of the firm's share in the equity market. Mbuthia (2003) states that the reason 75% of all JSE main board companies voluntarily provide earnings forecast is to decrease informational asymmetry and to help the investors price the share.

Jog & McConomy (2003) add that disclosure of earnings forecast decreases underpricing, and positively influences share returns once trade commences. This is especially true for small companies and companies making conservative estimates. They also state that forward looking statements such as earnings forecasts have a larger value than other uncertainty reducing tools.

An interesting finding by Cormier & Martinez (2006) is that IPO firms that do issue an earnings forecast are more likely to engage in earnings management. This is a mechanism to maintain credibility in the relationship with investors.

Another credibility preserving action is venture capital backed IPO firms unwillingness to submit an earnings forecast. A company may only perform one IPO in its lifetime while a

venture capital firm can back up many IPOs. There is therefore a risk to the venture capital firm that the investors can punish them for an inaccurate earnings forecast in their next IPO. (Citron, Cressy & Gerard, 2009)

Another group that is unwilling to disclose an earnings forecast is the “Younger, riskier, less credible firms” (Shi, Bilson & Powell, 2008). It is harder for that group of companies to make a dependable forecast. This finding is backed up by Jog & McConomy (2003) that found that a significantly larger number of the speculative companies choose not to submit an earnings forecast.

Conclusively, Jog & McConomy (2003) states that unless IPO firms have good reasons not to volunteer an earnings forecast, e.g. they are protecting a competitive advantage or have bad earnings prospects, then it is in their “best interest” to publish an earnings forecast. This is a conclusion drawn from looking at a two year return post IPO.

2.4.2 Why Earnings Forecasts are Important

An earnings forecast is important since they provide a key element for an IPO valuation (Eddy & Seifert, 1992). Modigliani & Miller (1958) defined the value of a company as “the current value of the future streams of cash flows” (Keasey & McGuinness, 1991) and through an earnings forecast investors can obtain data for the purpose of undertaking corporate valuation. The same article states “...a relationship between earnings forecasts and the pricing of new issues is just a restatement of the semi-strong form of the efficient market hypothesis (Fama, 1970), where pricing responds efficiently to the public disclosure of new information.”

As expected it has been shown that investors find earnings forecast to be useful (Waymire, 1984). Jelic, Saadouni & Briston (2001) discuss previous studies (Lev & Penman, 1990), (Baginski, Conrad & Hassell, 1993), (Pownall, Wasley & Waymire, 1993) where it has been shown that there is a link between managements’ earnings forecasts and adjustments of market expectations. The changes of expectations are measured by revision of analysts’ earnings forecasts and changes in share price.

In studies looking at specifically earnings forecasts for IPOs Lonkani & Firth (2005) summarises that investors depend on the information derived from earnings forecasts and that

it is instrumental when making an investment decision. The process is straight forward; investors compare the value derived from the earnings forecast with the IPO price (Firth, 1998).

There are also other ways to value a company e.g. market multiples, historical analysis, random walk analysis, discounted cash flow, dividend growth model and combinations thereof. The most common valuation technique for IPO firms is market multiples from comparable firms (Ritter & Welch, 2002). Different studies recommend different approaches e.g. Keasey & McGuinness (1991) advocates a random walk analysis of last years earnings; Shi, Bilson & Powell (2008) discusses the use of comparable companies price-to earnings ratios to last years earnings. Many of these analyses are hard to perform due to “the lack of history, or an absence of comparable firms.” (Jog & McConomy, 2003). Some of these analyses are also of limited relevance to the valuation e.g. historical analysis fail to take into account the rapid growth that often characterises an IPO firm and the expansion made possible by the IPO proceeds (Firth, 1998).

Overall it is concluded that management earnings forecasts have a greater predictive ability of actual earnings than forecast made by share analysts (Hassell & Jennings, 1986). Earnings forecasts are also found to have greater predictive abilities than time series forecast, see for example (Keasey & McGuinness, 1991), (Cheng & Firth, 2000), (Chen & Firth, 1999), and (Brown & Rozeff, 1978). Keasey & McGuinness (1991) confirms that earnings forecast have a greater accuracy than time series forecasts and that this is without being more biased.

Firth (1998), Jelic, Saadouni & Briston (2001), and Clarkson and others (1992) conclude that earnings forecast are of great importance to the market’s valuation of IPOs. Firth (1998) also concludes that it has a greater effect on market valuations than other signals of value such as retained ownership, historical profits, and net asset value.

It is interesting to note that although investors find earnings forecasts useful and despite that it is shown that they have a higher predictive value than other valuation methods, (Keasey & McGuinness, 1991) states that there is no strong correlation between the IPO offer price and the earnings forecast. It seems like the process of setting the initial price is disconnected from the value that is indicated by the earnings forecast. However, there is a connection to the

traded price which indicates that the secondary market does take into account the earnings forecast even though the primary market does not. (Keasey & McGuinness, 1991)

2.5 Earnings Forecast Accuracy and Bias

“Accuracy is freedom from mistake or error (...) conformity to truth or to a standard or model” (Merriam-Webster, 2011)

“Bias is the systematic error introduced into sampling or testing by selecting or encouraging one outcome or answer over others” (Merriam-Webster, 2011)

Time will always tell whether an earnings forecast was accurate or not, or biased or not. The absolute numerical nature of the forecast is that is easily measurable to which extent the forecast match with the actual turnout. It can be expected that the actual outcome will deviate from the forecast. A company's profit is affected by many factors, both micro factors affecting the individual company, and macro factors affecting the whole economy. The accuracy of an earnings forecast is not expected to be perfect. Moreover, every inaccurate forecast will have a bias, either it overestimates or underestimates the earnings. Statistically these errors should even each other out and there should be no bias. Empirical evidence suggests that so is not the case for many stock exchanges worldwide. This opens up for the suggestion that management inflate or deflate the forecasted earnings “...for the express purpose of maximizing their long term capital raising efforts for the lowest costs.” (Mbuthia, 2003)

IPO earnings forecast accuracy is a popular topic that features in many academic articles. There are many angles to earnings forecast accuracy: how is it measured; what is the accuracy and bias on different stock exchanges; what are the determinants of high forecast accuracy; and, what motivates high earnings forecast accuracy. The above topics are explored in the following chapter.

2.5.1 *How to Measure Forecast Accuracy and Bias*

The accuracy of the earnings forecasts are tested by comparing the forecasts to the actual outcomes. There are three measurements that frequently appear in the academic literature, see for example (Jelic, Saadouni & Briston, 1998) and (Firth & Smith, 1992a): forecast error (FE),

absolute forecast error (AFE), and squared forecast error (SQFE). The measurements analyse how erroneous the forecasts are, not at how accurate they are.

Forecast error

Forecast error percentage (FE) measures the bias of earnings forecast. Values above zero imply that the forecasted earnings are lower than the actual earnings i.e. management underestimated the future earnings. Values below zero imply the opposite; management overestimated the future earnings.

Forecast error as an aggregate has some characteristics worthy of mentioning. (Bodén & Hallert, 2005) summarise it as “...even if the measure is equal to zero, this does not say anything about the accuracy of the forecasts, since large negative and positive deviations cancel each other out.” This implies that forecast error is not a perfect accuracy measurement, but rather a forecast bias measurement. Forecast error is the most frequent measure used in the academic literature, see for example Jaggi (1997), Firth & Smith (1992a) and Jelic, Saadouni & Briston (1998).

The forecast error formula for company i at time t :

$$FE_{i,t} = \frac{AP_{i,t} - FP_{i,t}}{|FP_{i,t}|}$$

Where $AP_{i,t}$ = actual earnings for company i at time t
 $FP_{i,t}$ = forecasted earnings for company i for time t

Absolute forecast error

Absolute forecast error percentage (AFE) shows the degree of forecast inaccuracies. The measurement does not reveal forecast bias. Instead it measures the level of inaccuracy regardless of the direction of the inaccuracies.

The absolute forecast error formula for company i at time t :

$$AFE_{i,t} = \frac{|AP_{i,t} - FP_{i,t}|}{|FP_{i,t}|}$$

Where $AP_{i,t}$ = actual earnings for company i at time t
 $FP_{i,t}$ = forecasted earnings for company i for time t

Squared forecast error

Squared forecast error (SQFE) measures the squared forecast error. The measurement gives a greater weight to large errors. This can be seen as a more realistic measurement since large accuracy errors can have relatively greater influence on an investor's decision than small errors.

The squared forecast error formula for company i at time t :

$$SQFE_{i,t} = \left[\frac{AP_{i,t} - FP_{i,t}}{FP_{i,t}} \right]^2$$

Where $AP_{i,t}$ = actual earnings for company i at time t
 $FP_{i,t}$ = forecasted earnings for company i for time t

This study will analyse forecast errors, absolute forecast errors, and squared forecast errors in the formulas displayed above. Most earnings forecast accuracy studies only analyse forecast errors or absolute forecast errors. One reason for the absence of squared forecast errors can be that it has lower explanatory value for forecast accuracy than absolute forecast errors (Bodén & Hallert, 2005).

Many researchers highlight the risks with forecast errors, absolute forecast errors, and squared forecast errors. Forecasted earnings are in the denominator and with a small value in the denominator it does not need a much larger (negative or positive) value in the nominator in order to create a very large percentage. A small denominator value then results in large forecast error percentages. This is mathematically correct but might not reflect the purpose of measuring earnings forecast accuracy (Jelic, Saadouni & Briston, 1998). Sun & Liu (2009) lists five ways of measuring forecast errors and absolute forecast errors that mediates this effect. The options are to use absolute actual earnings, total assets, sales, book value of

common equity, or market value of common equity, as the denominator. See table 1 for a summary of what denominators previous studies have employed.

2.5.2 Previous Studies of Earnings Forecast Accuracy and Bias

This section contains a meta-study of previous research within the area of earnings forecast accuracy and bias. Results from 28 studies are compiled. Stock exchanges in fourteen countries have been examined during different time periods (from the late 1960 up until 2005). The examined time period stretches from one year to 18 years.

There is a clear preference for using forecasted earnings as the denominator; out of the known denominators all but three studies opt for forecasted earnings. There is also a clear preference for forecast errors as the measurement (25 out of 28), with absolute forecast error as the runner up (18 out of 28). Only three studies measure the squared forecast error.

Table 1 Findings from previous earnings forecast bias and accuracy studies

Author (year)	Country	Span	Denominator*	Measurement		
				FE	AFE	SQFE
Brown and others (2000)	Australia	1984-1997		-8.0		
Hartnett (1993)**	Australia			-30.4%	289%	
Clarkson (2000)	Canada	1984-1987	For. earnings	68.5%	89.3%	
		1992-1995	For. earnings	9.9%	23.1%	
McConomy (1998)	Canada	1983-1994	For. earnings	45.2%		
Pedwell, Warsame & Neu (1994)**	Canada	1983-1987	For. earnings	-77.7%	88%	
Clarkson, Dontoh & Sefcik (1989)**	Canada	1984-1987	For. earnings	99%		
Sun & Liu (2009)	China	1991-2005	For. earnings	0.45%	15.3%	
Chen & Firth (1999)	China	1991-1996	For. earnings	21.9%	40.1%	
Citron, Cressy & Gerard (2009)	France	1996-2000	For. earnings		46.2%	
Gounopoulos	Greece	1994-2001	For. earnings	8.0%	42.8%	3044%
Chen, Firth & Krishnan (2001)	Hong Kong	1993-1996	For. earnings	9.9%	22.0%	
Cheng & Firth (2000)	Hong Kong	1992-1995	Act. earnings	9.9%		
Jaggi (1997)	Hong Kong	1990-1994	Act. earnings	6.5%	12.8%	
Chan and others (1996)	Hong Kong	1990-1992	For. earnings		18%	
Selva, Ma & Wa (1994)**	Hong Kong	1986-1992		-14.1%		
Otogawa (2003)	Japan	1990-1999	Total assets	0.06%		
El-Rajabi & Gunasekaran (2006)	Jordan	1992-1996	For. earnings	-147.2%	163.4%	

Jelic, Saadouni & Briston (2001)	Malaysia	1980-1995	For. earnings	24.4%		
Jelic, Saadouni & Briston (1998)	Malaysia	1984-1995	For. earnings	33.4%	54.9%	1373.7%
Mohamad and others (1994) **	Malaysia	1975-1988	For. earnings	9.3%	27.9%	
Firth & Smith (1992a)	New Zealand	1983-1986	For. earnings	-92%	328%	19.100%
Mak (1989) **	New Zealand	1983-1987	For. earnings		100%	
Firth and others (1995) **	Singapore	1980-1993	For. earnings	20.1%	10.4%	
Tan (1987) **	Singapore	1972-1984		24%		
Mbuthia (2003)	South Africa	1994-2001	For. earnings	14.3%		
Lonkani & Firth (2005)	Thailand	1991-1996	For. earnings	-6.9%	35.7%	
Keasey & McGuinness (1991)	UK	1984-1986	For. earnings	5%	11%	
Dev & Webb (1972) **	UK	1968-1969		112%		

* For. earnings = forecasted earnings and Act. earnings = actual earnings.

** These studies have not been directly observed, the result of these studies has been accessed through other academic articles, see for example (Jelic, Saadouni & Briston, 1998), (Jaggi, 1997) and (Sun & Liu, 2009).

As can be seen from the compilation more than half of the studied countries are British Commonwealth countries or previous colonies: Australia, Canada, Hong Kong, Malaysia, New Zealand, Singapore, South Africa and UK. This is due to a common heritage regarding regulations. (Lonkani & Firth, 2005)

Earnings Forecast Bias

The earnings forecast bias have a wide range extending from -147% to 112%. Looking at only the numbers with forecasted earnings in the denominator, then the average is a slightly pessimistic 5.6%. The median value is 9.9%. This means that the systematic error in this meta-study is very modest and on the underestimating side.

There is an additional study that is excluded from the meta-study due to its extreme result. Lee & Yee (1993) studied Australian companies from 1976 to 1989 and found that the forecast bias was a staggering -999.4%. However, the median value was -42% indicating that the mean value have been influenced by extreme values.

China, France, Greece, Japan, Malaysia, Singapore, South Africa and UK are all pessimistic forecasters. New Zealand, Thailand, Australia and Jordan are overly optimistic. There are

mixed results for Hong Kong and Canada. The pessimists are in majority (eight out of 14), however it is hard to draw any conclusions from these diverse results.

Another way of analysing forecast bias is to look at how many percent of the companies have submitted optimistic/pessimistic forecasts. In China the split was almost 50/50 but with a small tilt towards pessimistic 50.59% (Sun & Liu, 2009). In Taiwan 66.9% of forecasts are optimistic (Jaggi and others, 2006). Note that the Taiwanese study did not publish any average errors; instead they focused on the distribution between optimistic and pessimistic forecasts.

Yet another way of analysing the data is to look at percentage of firms within a forecast error range. Sun & Liu (2009) states that 55% of the Chinese IPO firms have forecast errors within a $\pm 10\%$ range. The same article refers to the findings of Hartnett (1993), where only 8% of Australian IPO companies are within the same range. For Malaysian companies the ratio is 46% (Jelic, Saadouni & Briston, 1998) and 48% (Mohamad and others, 1994), for Jordanian companies 5% (El-Rajabi & Gunasekaran, 2006), for Singapore companies it is 60% (Firth and others, 1995) and 33% (Tan, 1987), and for Canadian companies 41% (Clarkson, Dontoh & Sefcik, 1989).

Previous studies have also analysed the extreme values, $\pm 100\%$. Only 0.8% of Chinese companies are outside of that range (Sun & Liu, 2009). In Australia that number is 53% (Hartnett, 1993), and in Jordan it is 39% (El-Rajabi & Gunasekaran, 2006).

Earnings Forecast Accuracy

The accuracy has a very wide spread from 10.4% to 328%. The average absolute forecast error is 78.1%. The median is even lower at 41.5%.

The Australian study (Lee & Yee, 1993), with an absolute forecast error of 1138.3%, is also excluded from the meta-study of earnings forecast accuracy due to its large impact on the average value.

Singapore, UK, and Hong Kong are the three countries that has displayed the highest earnings forecast accuracy i.e. the lowest absolute forecast errors. Australia, New Zealand and Jordan are the top three worse performers.

2.5.3 Determinants of Earnings Forecast Accuracy

There are many possible determinants of earnings forecast accuracy; some more easily measurable than others. Some determinants, such as managements' knowledge of the firm and its surroundings and their ability to create a forecast, could be expected to have the greatest influence. However those determinants are too idiosyncratic to measure. Other determinants are more standardised and easier to compare in a dataset.

(Lau, 2004) found in their summary of previous literature eleven determinants: forecast horizon, size of firm, financial leverage, past profit variability, change in general economic conditions, Final Four auditing firm, industry, manageability of profits, year of flotation, issuing house, and type of issue. Through other articles they are complemented with four more: profit trend, retained ownership, age of company, and venture capital backing.

Forecast Horizon

The first determinant is the forecast horizon i.e. the time between when a forecast is made and when the actual outcome can be known. Sun & Liu (2009) refers to American studies e.g. (Collins & Hopwood, 1980) that argue that a shorter forecast horizon increases the earnings forecast accuracy. This would be due to access to more information that can be included in the forecast. It is also due to less risk that "unexpected events may occur". This intuitive hypothesis has been confirmed by several studies (Sun & Liu, 2009), (Citron, Cressy & Gerard, 2009), (Chen & Firth, 1999), (Clarkson, 2000), (Eddy & Seifert, 1992), (Mak, 1989), (Keasey & McGuinness, 1991), (Lee & Yee, 1993), (Selva, Ma & Wa, 1994), (Hartnett, 1993), (Firth and others, 1995) and (Lonkani & Firth, 2005).

There are however studies that show no statistically significant relationship between shorter forecast horizon and higher earnings forecast accuracy (see for example, (Citron, Cressy & Gerard, 2009), (Jog & McConomy, 2003), (Chong & Ho, 2007), (Cheng & Firth, 2000), and (Firth & Smith, 1992a).

There are also studies that show a negative relationship between shorter forecast horizon and higher forecast accuracy, see for example, (Chan and others, 1996). Firth & Smith (1992a) ponders that a shorter forecast horizon is more susceptible to changes such as delays. This is illustrated by the fact that a one month delay has relatively more influence on a six month period than a 12 month period. Furthermore, Ferris & Hayes (1977) reasoned that the shorter

time horizon the less possibility for management to adapt capital expenditure decisions to align the actual earnings outcome with the forecast.

Size of Firm

The second determinant is size of firm. This can be measured in many different ways but the most common is on the basis of total revenue. It is also often measured on the basis of total assets at the end of the IPO year (Sun & Liu, 2009) and (Citron, Cressy & Gerard, 2009), and on the basis of market capitalisation (Lonkani & Firth, 2005).

The size of the company is hypothesised in (Sun & Liu, 2009) to have a positive impact on the level of earnings forecast accuracy. The article reasons that larger firms have access to greater competence and can therefore produce higher quality earnings forecasts. They also have a stronger influence over their situation and are less likely to fall victim to changes in the economy. Large companies are also more likely to have a greater operational diversification which ensures lower susceptibility to changes in the economic environment. (Citron, Cressy & Gerard, 2009) choose not to have an opinion regarding the size influence over earnings forecast accuracy since they counter the above arguments with the reasoning that larger firms also tend to be more bureaucratic and complex which limits the prospects of doing an accurate forecast. However, they did find a positive relationship between firm size and earnings forecast accuracy implying that larger companies have a higher level of accuracy. (Gounopoulos) and (Mbuthia, 2003) make the same finding. Also (Eddy & Seifert, 1992) in their study on earnings forecast errors in general confirms this finding. On the contrary, (Lonkani & Firth, 2005), (Chen & Firth, 1999), and (Firth & Smith, 1992a), show evidence for the opposite; larger companies have greater forecast errors. Other studies find no statistically significant connection between size of firm and earnings forecast accuracy (Chong & Ho, 2007) and (Jaggi, 1997). The latter also refers to the same findings of (Ferris & Hayes, 1977), (Firth and others, 1995), and (Lee & Yee, 1993).

Financial Leverage

Financial leverage is stated as another important determinant for earnings forecast accuracy. The predominant line of thought is that a high degree of leverage increases earnings volatility and consequently increases the forecast errors. This relationship is proven by (Eddy & Seifert, 1992) (which evaluated earnings forecast overall and not especially in relation to IPOs), and (Sun & Liu, 2009). However, in (Lonkani & Firth, 2005), (Firth & Smith, 1992a), and (Jaggi,

1997) the relationship is not proven to be statistically significant. Another interesting finding (Sun & Liu, 2009) is that highly geared companies are more prone to issue optimistic earnings forecast than their less geared peers.

Past Profit Variability

The fourth possible determinant of earnings forecast accuracy is past profit variability. The main assumption is that it is harder to forecast future earnings for companies with greater variability in their past earnings. This is a consequence of previous data being used as a starting point for the earnings forecast and historically trends being extrapolated into the future (Chan and others, 1996). High past profit variability can be a sign of a company's sensitivity to external changes; and a company with high sensitivity carries high risk and its future profit is therefore harder to predict (Sun & Liu, 2009). Earnings forecast accuracy is proven to increase if past profit variability is low. This is established by e.g. (Sun & Liu, 2009), (Chan and others, 1996), (Eddy & Seifert, 1992). (Lonkani & Firth, 2005) find no such connection.

Profit Trend

Closely related to past profit variability is the profit trend variable. Jelic, Saadouni & Briston (1998) presents the hypothesis as "The forecast error will be higher for the companies with a decline in actual earnings." This hypothesis was adapted by Jelic, Saadouni & Briston (1998) into an IPO setting from the finding by Capstaff & Paudyal (1995) that analyst forecasts are less accurate when earnings are decreasing. This hypothesis was confirmed; an IPO firm does not readily forecast a decrease in earnings.

Change in General Economic Conditions

This variable posits that abrupt changes in the overall economic climate will affect the earnings. If the economic conditions quickly change it will impact companies' performance in a way that is hard to predict in an earnings forecast. This implies that if the general economic conditions improve then the forecast will underestimate the actual earnings and vice versa. The changes in economic condition are measure by e.g. changes in equity market index, quarterly growth in gross domestic product (GDP) in comparison to the previous year, interest rate movements, exchange rate movements, and the previous months' returns on the stock market.

Previous research has shown support for the impact of changes in general economic conditions on the earnings forecast accuracy where "...the greater the change in economic condition, the larger will be the forecast error" (Chan and others, 1996), (Cheng & Firth, 2000), (Mbuthia, 2003) and (Mak, 1989).

However Lonkani & Firth (2005), Selva, Ma & Wa (1994), Ferris & Hayes (1977) and Citron, Cressy & Gerard (2009) found no statistically significant connection between the variable and earnings forecast accuracy.

Final Four Auditing Firm

The choice of an auditor is an important signal for an IPO firm. The listing company hopes that the selection of a high quality auditor may result in the transfer some of the positive reputation. Some studies also indicate that credible auditors are more likely to be involved in successful IPOs, see for example DeAngelo (1981) and Jelic, Saadouni & Briston (1998). Even though relatively few companies change auditor before performing an IPO, it can still be observed that "among those companies making auditor changes, there is a clear preference for more credible auditors." (Menon & Williams, 1991)

The four auditors that are categorised as more credible auditors are KPMG, Ernest & Young, Deloitte, and PricewaterhouseCoopers. They were once referred to the "Big Eight" which was consolidated to the "Big Six" and later on the "Big Five", followed by today's "Final Four". The name refers to the unlikelihood of competition authorities to allow further consolidation (all above constellations will be referred to as the "Final Four" since it is the current expression for these global auditing firms). These four auditing firms have in common that they have strong brand names and a broad international presence.

The auditors are often involved in the verification of the earnings forecast and the underlying assumptions. The general notion is that higher quality auditing firms will lead to higher earnings forecast accuracy. The "Final Four" are regarded as high quality auditing firms. This is due to the great importance of delivering high quality performance in order to protect their global brands and to avoid law suits ((DeAngelo, 1981). However, Simunic (2003) states that it is difficult to draw conclusions from many of the studies regarding the quality of "Final Four" firms.

The “Final Four” auditing firms have been proven by Chong & Ho (2007), Cheng & Firth (2000), Hartnett & Romcke (2000), and Clarkson (2000) to have greater earnings forecast accuracy.

However there are also findings, Citron, Cressy & Gerard (2009) and Sun & Liu (2009), which suggest that the “Final Four” to a larger extent than other auditing firms are connected with lower earnings forecast accuracy.

There are also studies that find no links, or inconclusive links, between “Final Four” auditing firms and earnings forecast accuracy, see for example, (Chan and others, 1996), (Chen, Firth & Krishnan, 2001), (Jaggi, 1997), (Jelic, Saadouni & Briston, 1998), (Firth & Smith, 1992b), (Firth & Smith, 1992a), (Lam & Chang, 1994), (Mohamad and others, 1994) and (Firth and others, 1995).

Age of Company

The age of the company at the time of listing has been used in many studies as a variable in regression analysis of earnings forecast accuracy. The age of the company is a way of expressing the number of operating years the company has been in business. Companies that have been operative for many years are assumed to have access to historical performance data from which an earnings forecast can be derived (Jelic, Saadouni & Briston, 1998) and (Mak, 1994). Moreover, a long operating history is likely to result in a greater level of experience and therefore a greater level of knowledge of the firm’s ability and how it reacts to external changes; inputs that are valuable to an earnings forecast. Younger companies may also have a naturally higher profit variability which hinders precise forecasting (Pástor & Pietro, 2003).

Jelic, Saadouni & Briston (1998) found that older companies have higher earnings forecast accuracy. Lonkani & Firth (2005), Firth & Smith (1992a), Jaggi (1997) and Lee & Yee (1993) found no such connections.

Jaggi (1997) also examines the dividend forecast accuracy and find that younger companies are statistically significant less accurate. The article provides an additional explanation for their finding: “younger companies may be more enthusiastic to provide a better picture of future performance”. In line with this statement is not hard to understand why investors view young companies’ earnings forecasts as unreliable (Pástor & Pietro, 2003).

Industry

Another determinant of earnings forecast accuracy is industry classification. The variable is not clearly defined and is measured in many different ways (Chan and others, 1996); most often as a binary variable (industrial and non-industrial), but also in industrial groupings. There is little literature regarding the nature of the connection between industry and earnings forecast accuracy (Jelic, Saadouni & Briston, 1998), but it is often included in studies since the data is readily available.

Chan and others (1996) refers to Dev & Webb's (1972) finding that the level of accuracy differs between industries. Mak (1989), referred to by Chan and others (1996) and Jelic, Saadouni & Briston (1998), weakly confirms this finding. Jelic, Saadouni & Briston (1998) and Mbuthia (2003) confirm the connection too with a strong statistical significance. Moreover, Chen & Firth (1999) found that firms in the property industry have lower accuracy than other industries.

Jelic, Saadouni & Briston (1998) discusses possible reasons to how industry classification is connected to earnings forecast accuracy. One possible reason is that some industries have higher consistency and lower volatility in their earnings. I.e. that profit levels are harder to predict for some industries than others. As an example the article presents the utility industry where contracts often are long term, demand constant, and prices heavily regulated. This decreases the exposure to changes in the economic environment.

Chan and others (1996) hypothesises, along the same line of thought as above, that earnings of industrial companies in general are more rigid and therefore easier to forecast. The larger consistency is said to be due to customers' orders being made long before actual production commences. Their hypothesis was found to be statistically significant by Gounopoulos, but not by other studies, see for example (Chan and others, 1996), (Selva, Ma & Wa, 1994) and (Jaggi, 1997). Jelic, Saadouni & Briston (1998) ponders that the industry categorisation might be too crude to find the determinant that actually drives the relationship to earnings forecast accuracy.

It is interesting to note that the actual determinant in Jelic, Saadouni & Briston (1998) study can be a tougher regulatory environment. A stipulation introduced in 1996 demands that

Malaysian IPO firms in certain industries (services, construction, and specialised industries) guarantee 90% earnings forecast accuracy. As stated below Jelic, Saadouni & Briston (1998) did indeed find a strong association between belonging to one of the tougher regulated industries and higher earnings forecast accuracy.

Mbuthia (2003) found that there are differences between industrial groupings for companies listing on the JSE. Not surprisingly mining companies and venture capital companies have too optimistic earnings forecast, while companies from the IT-, electronics-, electrical- or venture development sector are too pessimistic. Property companies are found to have the most accurate forecasts.

Manageability of Profits

There are two aspects to manageability of profits in regards to IPOs. Firstly is the management of earnings prior to an IPO where the purpose is to increase the attractiveness of the company to investors. Lau (2004) establishes that this is a common practise in China. The extent of managed earnings increased when the IPO price went from being based on a forecasted EPS (earnings per share) to a three year average of EPS. When IPO pricing reverted back to being based on a forecast rather than historical figure, the behaviour of managing earnings went down. This pattern was also observed by Teoh, Welch & Wong (1998).

The other aspect of manageability of earnings is what happens after an IPO has taken place. This implies that management influence actual earnings to more closely resemble the earnings forecast. The incentive for this behaviour is to protect credibility versus investors. The theory is that if earnings are easily manageable through corporate decisions, then management will use that tool to increase their earnings forecast accuracy. Researcher have suggested that IPO firms use creative accounting to make the first year's earnings look great for investors, while the second year's earnings plummet ((Kwok, 1994) referenced by (Chan and others, 1996)).

Lonkani & Firth (2005) argues that it is doubtful that level of earnings management can be properly defined and measured, and that the current models are not helpful. Chan and others (1996) excludes this variable in their study for the same reasons; "collection of data and the method of measurement were quite complicated". However, Lau (2004) when looking at

earnings management, prior to an IPO, analyses current accruals and non-operating income as an indicator for manageability.

Year of Flotation

This variable is partly related to the previously discussed variable “change in general economic conditions” since it also reflects the current state in the economy. The market value of AltX companies crashed during the global financial crisis in 2008 (see figure 2) which indicates investors’ belief in AltX companies during that period. This may be partly sentiment but there are also rational reasons to worry about small cap companies during major crisis. The small firms’ liquidity can dry up and affect daily operations. Another reason to why year of flotation is an important variable to include is the previously mentioned phenomena of hot and cold IPO markets. Chan and others (1996) discusses that in hot IPO periods there are greater competition for investors’ funds and that management view earnings forecast accuracy as more important to increase the firm’s attractiveness. Chan and others (1996) findings confirm that there is a link between year of flotation and earnings forecast accuracy. Chen & Firth (1999) confirms a link between accuracy and one of their studied years. Connection between year of flotation and accuracy is not confirmed by Chong & Ho (2007).

Issuing House

This determinant is wired the same way as the auditor variable. The underlying assumption is that a highly prestigious underwriter, sponsor or accountant delivers a higher quality earnings forecast. Chan and others (1996) refers to a large array of studies that claim that the reputable agents “are often associated with the more ‘successful’ issuers.” Despite that connection in the literature the study excludes the variable due to classification problems. They found that measures such as the number of IPOs performed by the issuing house (used by e.g. (Jelic, Saadouni & Briston, 2001) were not applicable to the Hong Kong stock exchange. Lonkani & Firth (2005) also choose to exclude that variable for the same reasons; there is no clear agreement to which underwriters are seen as prestigious. However Jelic, Saadouni & Briston (2001) did include the variable but found no link between a prestigious underwriter and high earnings forecast accuracy. Chong & Ho (2007) also included the variable and found a positive relationship between highly reputed underwriters and a lower level of earnings forecast errors.

Type of Issue

This variable refers to the different methods of listing mentioned previously. There are the front door methods i.e. introduction, public offer, and private placing; and the back door methods i.e. cash shell, and reverse take over. For AltX on the JSE it should be added that some companies have transferred to the AltX from other exchanges under the JSE umbrella. Type of issue as a determinant for earnings forecast accuracy is hard to come by in previous research. Chan and others (1996) dismissed the variable since most issues on the Hong Kong stock exchange are by public offer. Lau (2004) made the same choice.

Retained Ownership

Retained ownership refers to the share of the stocks that are retained by the initial owner in an IPO. Often in an IPO the initial owners are management, and are therefore in charge of producing the earnings forecast. This is an important variable in signalling theory since high retention levels indicates that the owners believe in the future prospects of the firm. Jelic, Saadouni & Briston (1998) hypothesised initial owners that plan to keep a large stake in the company “are likely to commit more resources and attach a greater importance to the earnings forecast as a signal of the quality of their company.” Chong & Ho (2007) argues that initial owners have an incentive to protect their reputation, since it affects the value of their share holding and also to build relations with investors if they at a later stage want to offload their holdings. The greater the retained ownership the higher the forecast accuracy was confirmed in Jordan (El-Rajabi & Gunasekaran, 2006).

Retained ownership was not found to be a statistically significant variable for neither Jelic, Saadouni & Briston (1998) nor Chong & Ho (2007). This was also the case for Jelic, Saadouni & Briston (2001) and Selva, Ma & Wa (1994). Lonkani & Firth (2005) choose not to include the variable in their analysis due to specific attributes of the stock market in Thailand, and also because they find that “an opposite prediction is given by the entrenchment and expropriation arguments.”

Venture Capital Backing

For a venture capital firm an IPO is a way to exit an investment or decrease its ownership stake. Venture capital firms are repeat players in the financial market and are as such likely to go through more than one IPO in their lifetime. The success of their exit depends on the ability to sell their holding at a high price. This ability is influenced by their reputation in the

market place. Their reputation, in turn, is affected by their previous earnings forecast accuracy. Consequently it is of great importance to venture capital firms to produce accurate earnings forecast. Citron, Cressy & Gerard (2009) find that venture capital firms are more reluctant to volunteer an earnings forecast. Moreover, they do not find support for venture capital firms having an overall higher level of earnings forecast accuracy, but they do find that highly prestigious venture capital firms have a higher accuracy than the venture capital firms with less reputation at stake.

2.5.4 Motivations for High Level of Accuracy

“...there is a tendency for an issuing firm to exaggerate the quality of its project...” (Chen & Firth, 1999)

As mentioned previously there will always be a level of inaccuracy when it comes to forecasting. There will always be changes in the micro and macro environment of a company. On top of this there can be an incentive for managers to overstate or understate the earnings forecast to ensure the lowest possible cost of equity. There are two scenarios that motivate managers to misstate the forecasted earnings. Firstly, they may wish to understate forecasts to create a success story where management outperform expectations. This would lead to more favourable conditions in a future capital raising. The second scenario is to exaggerate future earnings in order to raise as much money as possible in the IPO. (Mbuthia, 2003)

Some researchers have a great belief in the market's ability to discount for forecast bias. As Clarkson and others (1992) concludes: “the forecasts are priced out in a sophisticated rather than naive fashion by the capital markets.” This is not the opinion of Jelic, Saadouni & Briston (2001) that states that “Investors are not able to differentiate between biased and unbiased earnings forecasts prior to listings.”

Regardless of how well the market accounts for the inaccuracy in forecast earnings there are still the two main incentives for companies to increase, or decrease, earnings forecast accuracy.

On the other hand there are motivations for management to increase forecast accuracy. These motivations include both punishments and rewards. E.g. high forecast accuracy decreases the risk of litigation and increases the possibility of establishing a good reputation.

Note that the motivation for high earnings accuracy can be easily mixed up with determinants of earnings forecast accuracy. Both motivations and determinants “drive” earnings forecast accuracy, but the determinants are “objective” variables that are difficult to manipulate while motivational factors can be created and institutionalised.

Institutionalised Punishment

China is a country with a clearly stated punishment for inaccurate earnings forecasts. Sun & Liu (2009) study the positive impact of a new Chinese regulation on earnings forecast accuracy. In China overestimation of future earnings is seen as fraudulent activity. The law has successfully resulted in less overestimation of future earnings. The law states that “...IPO firms and their auditors must explain and apologize to the public (...) if predicted earnings are overestimated by 10–20% compared to actual earnings.” If the overestimation is larger than 20% then, Lau (2004) reports, the chief executive officer and the chief financial officer can be banned from future managerial positions in listed companies. The punishment for larger than 20% overestimation varies to match the severity of the case.

In Thailand there are no penalties connected to the degree of inaccuracy as it is in China, but there are punishments for companies that deliberately submit misleading earnings forecasts (Lonkani & Firth, 2005). In Canada those penalties can amount to all capital raised by the IPO (Clarkson and others, 1992).

On the AltX there are several institutionalised punishments. If a company realises that it is going to divert more than 20% from its forecast then the company is required to issue a statement. This process is monitored in terms of the continuous listing obligations of the JSE. Moreover, if there is suspicion that the company has maliciously published a misleading forecast then an investigation will be initiated. If the company is found to be in violation of the listing requirements then the JSE is permitted to impose an appropriate punishment. The punishment can entail termination or suspension of trade, a public or private reprimand, or a fine up to ZAR5 million. The responsible director can also be banned from having a managerial position in a listed company for a set time period. In addition, the directors sign a

liability statement which enables shareholders to sue the company if they believe that the company has acted fraudulently. (JSE, 2010d)

Threat of Litigation

Many academic articles refer to the threat of litigation as one of the motivations behind IPO firms' decisions not to disclose earnings forecasts. The most frequently cited example is the US where very few companies provide a forecast. However it is difficult, in the academic literature, to come across a case where an IPO firm has been taken to court. Clarkson and others (1992) mention that they do hear about law suits and that it is increasingly occurring due to investors more actively safeguarding their investments.

However, the threat of litigation is believed to be enough motivation for companies to try and increase the quality of their earnings forecasts (Hughes, 1986).

Lock Up Arrangement

Lock up arrangements where the initial owners are not allowed to sell the share holdings during a set time period is a common phenomenon. On the AltX the initial owners have to hold their shares in trust. 50% of the directors' share holding will be locked up the first year. The second year half that amount is released, but 25% of their shareholdings are still locked up. (JSE, 2010d) In the US the lock up period for shares that are not immediately sold at the listing is 90 days. In Canada the shares are locked up for long time periods, whereby only 10% of the shares can be sold nine months after the IPO. The remainder is being accessible over the next couple of years. The UK also has a lock up period that applies to almost all IPOs. (Jog & McConomy, 2003) In Hong Kong shareholders with a 35% or larger stake cannot sell shares for the first six months after the IPO. In the following six months they are allowed to sell shares as long as they keep their stake above 35%. (Cheng & Firth, 2000) Singapore has arrangements where the main board firms are not allowed to sell shares within the first six months and SESDAQ (another section of the exchange) have a lock up period of 12 months. (Chong & Ho, 2007)

In Singapore the lock up period has proven to be a very efficient motivation for increased earnings forecast accuracy. Chong & Ho (2007) find that "...the longer the lockup period, the more conservative the forecast." Lock up periods removes the initial owners' incentive to submit too optimistic forecasts. Given that the market will punish low accuracy (see section

on share performance) then overly aggressive forecast are only beneficial to the initial owners that sell their stake at the IPO, not the owners that have their ownership locked up.

Reporting Requirements

Many studies suggest ways to improve earnings forecast accuracy that includes more rigid reporting requirements. "...the regulators can introduce a number of reporting requirements to ensure the credibility of forecasts. For example, if a firm includes a forecast in the IPO prospectus, it should also disclose the principal assumptions in forecasting and also provide an auditor's review of the forecast." (Li, 2009) Moreover, McConomy (1998) reports a link between decreased optimistic forecast bias and a shift from review to audit level assurance of the quality of the forecast. This is confirmed by Clarkson (2000) that also found that the shift also increases forecast accuracy.

Share Performance

When exploring if share performance creates an incentive for increasing earnings forecast accuracy it is important to note that there is well-known pattern to IPO performance. In general the return on the first day is significantly positive (the previously mentioned phenomenon of underpricing) and the long term return is dismal. Therefore share performance is divided into two parts: short term and long term.

Short Term Share Performance

When a company is introduced to the stock exchange it is at a set IPO price. This price is set by the IPO firm in collaboration with their advisors and underwriter. The price is as a reflection of the value they ascribe to the firm in combination with the demand in the primary market. There is a wide array of literature that explores the exact mechanism behind this pricing process. Overall it can be observed that once trading commences the market price of the share exceeds the initial IPO price, as mentioned previously in the section on underpricing. The nature of the earnings forecast is likely to affect the initial IPO price since an optimistic earnings forecast indicates a higher value and consequently should have a higher IPO price. Jelic, Saadouni & Briston (2001) presents the possible connection that firms with optimistic earnings forecasts are less underpriced i.e. have lower first day returns. Indeed the findings show that optimistic forecasters are on average less underpriced, but the findings are not statistically significant. Firth & Smith (1992a) made the same finding. There is a paucity of research regarding how this affects the incentive to create an accurate earnings forecast. It can be hypothesised that retained ownership should be included in this discussion since this

would have an impact on the incentive structure when creating an earnings forecast. Excluding the previously mentioned incentive for the initial owners' to exaggerate the forecast in order to minimise the underpricing, there are other potential stakeholders that benefit from underpricing. Underwriters have an incentive to influence management to publish a pessimistic forecast. They are allowed, and at times contractually obliged, to buy the issued shares on the primary market. The greater underpricing the higher first day returns.

Long Term Share Performance

Jelic, Saadouni & Briston (2001) reflects that the connection between earnings forecast accuracy and long term share performance is an area with very little research. The causality is whether the earnings forecast are impacting the long run performance. If there is causality then that might affect managements' incentive to create accurate earnings forecasts.

Firth (1998) analysed whether earnings forecast accuracy impacts long term performance and concluded that it is a "major explanatory variable". This is a consequence of investors using the earnings forecast when valuing the shares. When the actual earnings are published, and the inevitable forecast errors revealed, investors adjust their valuation of the share. When that adjustment is made there might be a change in investment decision which can impact the share price, and hence the share performance (Eddy & Seifert, 1992). This research was designed to identify whether positive earnings forecast errors (i.e. underestimated earnings) implied positive returns in the first year after listing. This hypothesis was accepted. Jelic, Saadouni & Briston (2001) has a similar research design where the IPO firms are divided into pessimistic and optimistic forecasters and the connection to long term returns are tested. Pessimistic forecasters are found to fare better on the stock market than the optimistic forecaster during the first year.

Conclusively, "...firms including optimistic forecasts in their prospectuses are penalized significantly in the marketplace..." (Jog & McConomy, 2003). However, this is controversial; Brown (2003) that argues that it is not possible to draw those conclusions from the Jog & McConomy (2003) study.

Reputational Risk

Lastly, and perhaps most importantly "The costs of forecast inaccuracy are broader than the explicit penalty (...) and include costs associated with loss of reputation. These costs are

nontrivial for firms that intend to return to the market for additional financing at some future date. Hence, IPOs are accountable to the market for forecast errors.” (Clarkson and others, 1992)

In conclusion IPO firms with an inaccurate earnings forecast are penalised either directly through institutionalised punishment, threat of litigation, lock up agreements or reporting requirements, or indirectly through poor share performance and reputational hazards.

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3 Methodology

Methodology is structured into three sections: research design, hypotheses and tests, and evaluation of study. The first section describes the design of the study and discusses the sample and data. The second section is concerned with how to answer the two questions statistically, and sets up hypotheses for the regression analysis. The third part is a discussion of the quality of the study in regards to validity, reliability and demarcations.

3.1 Research Design

This is a descriptive quantitative study, with an deductive approach. The theoretical framework has zoomed in from the general concept of IPOs to the specifics of earnings forecast accuracy and its determinants; a top down approach. From the theory, hypotheses are created that will be tested in a new context, the alternative exchange in South Africa. Actual quantitative observations from the AltX are tested in several statistical tests. Regression analysis is set up to test the hypotheses regarding determinants of earnings forecast accuracy. In order to ensure a high quality of the results several statistical tests of the data are performed.

3.1.1 Sample

According to a comprehensive list supplied by JSE there are 92 firms that are, or have been, listed on the AltX.

Table 2 Number of listed and delisted firms on the AltX 2003-2010

Type of listing/delisting	Nr. of firms	Incl. in sample
Private placement	64	60
Introduction	4	4
Transfer from the main board	6	0
Transfer from the venture capital or development capital board	10	0
Secondary listing	5	1
Reversed listing	3	2
Total number of companies to list on the AltX	92	67
Delisted	6	
Transfer to main board	13	
Merger	3	
Vehicle for reversed listing	1	
Total number of firms listed on the AltX (January 2010)	69	

There are different procedures and requirements for companies that list directly onto the AltX and companies that transfer to the AltX. Companies that are transferring from the main board, venture capital board or development capital board are not required to submit an earnings forecast. Therefore there are no earnings forecasts accessible for the period following the transfer. In some cases there are earnings forecasts available for the listing at the previous exchange. In order not to mix together the level of earnings forecast accuracy for different exchanges those firms are not included in the sample. This excludes 16 companies from the study.

Companies that do a secondary listing are in most cases exempted from submitting an earnings forecast. However, there is no reason to exclude earnings forecast from secondary listing companies. Therefore the sole company that has submitted an earnings forecast is included into the sample. The other four companies are excluded.

The remaining firms that are listed through private placement, introduction and reversed listings are included. Five companies are excluded; two companies since they have been granted exemption from submitting an earnings forecast, and three companies since their earnings prospectuses cannot be located.

This results in a total of 67 firms that are included in the sample.

3.1.2 Data

All data in this study has been collected from secondary sources. The earnings forecast data has been gathered from each firm's IPO prospectus. The process of collecting IPO prospectuses in South Africa is onerous and resource intensive. The basis of the search has been a list provided by the JSE of all 92 companies that have been, or are listed on the AltX. Firstly, the search for the prospectuses commenced at each respective company's website. Each of the 92 companies' websites were examined and a small minority of the prospectuses were found. The second step was to contact the transfer secretaries. One of the secretaries had access to a handful of prospectuses which were received in the mail as hard copies. Thirdly, through an investigation of Profile's over 20 share data publications (Profile's, 2003-2010) each company's designated advisor was identified. The designated advisors were contacted by email. Many of the AltX companies had changed designated advisors since their listing and a

second round of requests were sent out to the designated advisors. The fourth step was to contact each respective company. This process often involved speaking to the public relations department, executive secretaries, and on many occasions the chief financial officer. The fifth step was to contact the printing company that handled the production of the physical copy of the prospectus. Despite this extensive search nine out of the 92 prospectuses were still not possible to obtain.

All actual earnings data and financial ratios are collected from McGregor's database. Data regarding South Africa's gross domestic product is provided by Statistic South Africa (South Africa. Dept. of Public Enterprises, 2004). Company specific data such as year founded, date of listing, type of listing et cetera are collected either from the IPO prospectus or from Profiles share data publications (Profile's, 2003-2010).

Some data is published in a foreign currency. The foreign currency has been translated into South African Rands at the January 2011 conversion rates (XE, 2011). The conversion is necessary to ensure compatibility in the data so that the ingoing variables, e.g. size of firm, in the regression analysis are comparable. For the same reason the forecasts and the actual figures been converted into 12 month periods.

3.2 Hypotheses and Tests

3.2.1 Earnings Forecast Accuracy and Bias

The first objective of this study is to test the earnings forecast accuracy. This will be tested through measuring the average of forecast error, absolute forecast error and squared forecast error.

3.2.2 Determinants of Earnings Forecast Accuracy

The second objective of this study is to examine the determinants for earnings forecast accuracy for companies listed on the AltX. The literature review identified 15 variables that are plausible determinants of earnings forecast accuracy. The possibility to employ these variables in regression analysis depends on the accessibility of data. The specific requirements from the AltX ensure that some data is available through the IPO prospectus. Other data is available through external data providers. The following section concludes how each variable

is measured; what data the variable requires; and also in which direction, positive or negative, the variable is expected to contribute to the regression i.e. the hypothesis.

Forecast Horizon

Forecast horizon is measured as the number of days, e.g. (Chan and others, 1996), or months, e.g. (Citron, Cressy & Gerard, 2009), between two dates. The data requirements for this variable are quite straight forward. Two data points are needed; the date of the IPO listing and the year-end date of the first forecasted period.

This variable has been found to have different effects on earnings forecast accuracy. Some studies confirm that a shorter forecast horizon is linked to higher earnings forecast accuracy ((Sun & Liu, 2009), (Citron, Cressy & Gerard, 2009), (Chen & Firth, 1999), (Eddy & Seifert, 1992), (Clarkson, 2000), (Mak, 1989), (Keasey & McGuinness, 1991), (Selva, Ma & Wa, 1994), (Firth and others, 1995) and (Lonkani & Firth, 2005). Another study found that a shorter forecast horizon was related to lower earnings forecast accuracy (Chan and others, 1996). Some studies conclude find no statistically significant relationship ((Citron, Cressy & Gerard, 2009), (Jaggi, 1997), (Chong & Ho, 2007), (Cheng & Firth, 2000), and (Firth & Smith, 1992a)).

In accordance with the results of the majority of previous studies; ***hypothesis one***: longer forecast horizons are expected to be related to higher absolute forecast errors i.e. lower earnings forecast accuracy.

Hypothesis one will be tested through regression analysis. The variable will be measured in months (with decimals) between the listing of IPO and the year end of the examined year. The input into the second year regression will therefore be larger, by 12 months, than the input to the first year regression.

Size of Firm

This variable can be measured in many different ways. The two most commonly used measures are total revenue and total assets. However, it has also been measured in terms of market capitalisation (Lonkani & Firth, 2005). The data can be taken from the time of the IPO or at the year end for the forecasted period. The latter seem to be the predominant choice (e.g.

(Sun & Liu, 2009) and (Citron, Cressy & Gerard, 2009)). All the data is publicly available through the IPO prospectus, share market data providers, or annual reports.

There are different findings regarding which direction the variable influences earnings forecast accuracy. Citron, Cressy & Gerard (2009) and Eddy & Seifert (1992) find that larger firm size is connected with higher earnings forecast accuracy. Lonkani & Firth (2005), Firth & Smith (1992a) and Chen & Firth (1999) find the opposite. Other studies find no statistically significant connections (Jaggi, 1997), (Firth and others, 1995), (Lee & Yee, 1993), and (Chong & Ho, 2007).

In line with the intuitive reasoning that larger firms should have access to greater resources is ***hypothesis two:*** larger firms are expected to have higher earnings forecast accuracy.

The hypothesis will be tested through a regression analysis of actual total revenue for the first forecasted year.

Financial Leverage

There are many ratios in the financial literature that reflect the degree of financial leverage e.g. the debt ratio, times interest earned, and the debt to equity ratio. Most earnings forecast accuracy studies use the debt ratio, e.g. (Sun & Liu, 2009) and (Citron, Cressy & Gerard, 2009). There are however diverging practises regarding the timing. Citron, Cressy & Gerard (2009) calculate the debt ratio from the last balance sheet before the IPO. Sun & Liu (2009) use the balance sheet from the end of the IPO year. This measure demands access to annual reports pre- and post IPO. Since AltX companies do not necessarily have pre IPO data, the debt ratio (debt divided by total assets) is calculated from the actual financials for year end of the first forecasted year. The debt ratio is sourced from McGregor's data base and is defined as long term liabilities plus short term liabilities, divided by total assets.

Eddy & Seifert (1992) and Sun & Liu (2009) found that a high degree of financial leverage is connected to lower earnings forecast accuracy. Lonkani & Firth (2005), Firth & Smith (1992a) and Jaggi (1997) could not verify that relationship.

In accordance with what many previous studies have established; ***hypothesis three:*** highly geared firms are expected to have lower earnings forecast accuracy.

Past Profit Variability

This variable is measured as the coefficient of the variation of profits over a three year time period, see for example (Lonkani & Firth, 2005) and (Chan and others, 1996). The larger the past profit variability, the more difficult it is to make accurate earnings forecasts ((Sun & Liu, 2009), (Chan and others, 1996) and (Eddy & Seifert, 1992)). Lonkani & Firth (2005) find no such connection.

An analysis of past profit variability requires historical earnings data. 25% of the companies listing on the AltX have no operational or financial history, and another 17% has only one or two years history, consequently this connection is difficult to test in the AltX context.

Profit Trend

In line with past profit variability, a test of profit trend requires historical financial data. The connection between declining profit and lower earnings forecast accuracy will therefore not be tested in this study (Jelic, Saadouni & Briston, 2001).

Change in General Economic Conditions

This variable can be defined in many ways. Lonkani & Firth (2005) analyse the stock market return in the month prior to the IPO. Cheng & Firth (2000) measure the stock market return three months prior to the IPO. Citron, Cressy & Gerard (2009) and Chan and others (1996) analyse changes in gross domestic product (GDP). Both stock market return data and GDP development data is available in South Africa.

Cheng & Firth (2000), Chan and others (1996) and Mak (1989) found evidence that large changes in the general economic condition are linked to lower earnings forecast accuracy. Other studies could not verify this link with statistically significant certainty (Lonkani & Firth, 2005), (Selva, Ma & Wa, 1994) and (Citron, Cressy & Gerard, 2009).

In line with the predominant reasoning, and some of the findings; ***hypothesis four:*** larger changes in the general economic conditions are expected to result in lower earnings forecast accuracy.

The changes in general economic conditions will be measured as the absolute difference between the last quarterly GDP growth before the IPO and the same quarter one year later, or for the second year regression, two years later.

Final Four Auditing Firm

This is a binary variable where the IPO firm either has a final four auditor or not. The data is accessible in the IPO prospectuses.

There are studies that confirm a connection between a final four auditing firm and higher earnings forecast accuracy (Chong & Ho, 2007), (Cheng & Firth, 2000), and (Clarkson, 2000). Other studies confirm the opposite relationship (Citron, Cressy & Gerard, 2009) and (Sun & Liu, 2009). However, numerous studies could not draw a statistically significant conclusion (Chan and others, 1996), (Jaggi, 1997), (Jelic, Saadouni & Briston, 1998), (Firth & Smith, 1992a), (Firth & Smith, 1992b), (Mohamad and others, 1994), and (Firth and others, 1995).

In accordance with the majority of the studies with statistically significant findings, ***hypothesis five:*** an IPO firm with a final four auditing firm is expected to have higher earnings forecast accuracy.

Age of Company

The age of the company is simple to measure and easy to access through Profile's share data publications (Profile's, 2003-2010). Age is calculated as the difference between the year founded and the year listed. Jelic, Saadouni & Briston (1998) confirmed that older companies provide higher earnings forecast accuracy. Lonkani & Firth (2005) and Jaggi (1997) found no such connection.

In accordance with the intuitive argument that wisdom comes with age, and two of the above studies; ***hypothesis six:*** older IPO firms are expected to have a higher earnings forecast accuracy.

Industry

The IPO firms are grouped into two or more categories when testing this variable. Most often it is a binary variable where two groups are tested against each other such as industrial and non-industrial (see for example (Chan and others, 1996) and (Sun & Liu, 2009)). In order to

perform this test, categorisation of the IPO firms has to be made. In South Africa this sort of data is provided by financial data providers such as McGregor. However, the size of the sample is too small to include all industry categories. However, one third of AltX companies are active in the construction industry. The basis of the hypothesis is that construction projects are long which makes it easier to plan ahead.

Dev & Webb (1972), Mak (1989) and Jelic, Saadouni & Briston (1998) all confirmed a connection between industry belonging and earnings forecast accuracy. Other studies could not confirm that connection (Chan and others, 1996), (Selva, Ma & Wa, 1994) and (Jaggi, 1997).

The findings in previous research will be tested with an adjustment made for the AltX; ***Hypothesis seven:*** IPO firms in the construction industry are expected to have higher earnings forecast accuracy than a non-construction firm.

Manageability of Profits

It is often difficult to measure whether management have made changes in order to impact the earnings outcome. The measurement employed by Lau (2004) is current accruals i.e. (current assets – cash) – (current liabilities – current part of long term debt). Data is accessible through annual reports. This variable is not tested for the same reason it is excluded from most other studies, the process of data collection is extensive and the measurement is not seen as dependable.

Year of Flotation

This variable is very easy to measure and obtain, the year of flotation is the year the company is listed and that information is readily available from numerous sources. Due to the sample size, the year of flotation is tested as a binary variable: before 2008 and 2008 and later. This may offer an indication to the impact of the global financial crisis on the forecast accuracy.

Chan and others (1996) and Chen & Firth (1999) confirm a connection between the year of flotation and earnings forecast accuracy. Chong & Ho (2007) cannot confirm such connection.

In accordance with the findings of e.g. Chan and others (1996) *hypothesis eight*: companies listed before 2008 are expected to have a higher level of earnings forecast accuracy.

As an incremental study, the year of flotation is coded as binary variable. Listing in a hot IPO period or not will be tested in a separate regression analysis. It will also be tested as a scale variable to see if the accuracy has increased or decreased since the inception of the AltX.

Issuing House

The categorisation of issuing house is not as straight forward as the final four division of auditing firms. A measure such as number of IPOs performed by the issuing house has been used in the absence of clear rankings. The issuing house is not relevant in the context of this study. AltX companies can have a market capitalisation as low as R2 million, and often issuing houses will be involved in the listing of larger firms. However, every AltX listed company appoints a designated advisor that holds some of the responsibilities of an issuing house. Due to the large number of designated advisors, there are 12 in the sample, and lack of recognised divisors, it is not possible to include this variable in the regression analysis.

Type of Issue

This variable is often dismissed when it is found not to be applicable to the context of the study. The same is true for the IPO firms on the AltX. The great majority of listings are private placements and more variability in the data is needed to draw statistically significant conclusions.

Retained Ownership

Retained ownership refers to the relative amount of shares that are being hold by the initial owner in an IPO. It is measured by the number of retained shares divided by total amount of shares. El-Rajabi & Gunasekaran (2006) confirmed a connection between retained ownership and accuracy. Neither Jelic, Saadouni & Briston (1998), Chong & Ho (2007), Jelic, Saadouni & Briston (2001) or Selva, Ma & Wa (1994) could confirm this connection. The variable is not included in this study since the data is not accessible.

Venture Capital Backing

This is a binary variable where an IPO firm either has venture capital backing or not. This variable is excluded from the analysis since the data is not readily available for AltX listed companies.

Table 3 Variables to be included in regression analysis

Independent variables	Short name	Direction of influence
Forecast horizon	HORIZ	+
Size of firm	SIZE	-
Financial leverage	LEVER	+
Change in general economic conditions	ECON	+
Final four auditing firm	FOUR	-
Age of company	AGE	-
Industry	INDU	-
Year of flotation before/after 2008	YEAR	+

Note that a positive direction (plus) implies a higher absolute forecast error (AFE) which implies a lower earnings forecast accuracy. For example, a longer forecast horizon is hypothesised to give a higher AFE i.e. lower accuracy.

The above independent variables are tested in a multiple regression analysis with forecast error as the dependent variable. The regression analysis model looks as follows:

$$AFE = a + b_1HORIZ + b_2SIZE + b_3LEVER + b_4ECON + b_5FOUR + b_6AGE + b_7INDU + b_8YEAR$$

There will be two regression analyses, for both the first and second forecasted year. The dependent variable is the measurement of accuracy: absolute forecast error after tax. This is to make the result comparable to previous studies (e.g. (Sun & Liu, 2009), (Clarkson, 2000), (Jelic, Saadouni & Briston, 1998), (Jaggi, 1997)). Absolute forecast errors are measured and not forecast errors, since the study wish to analyse the determinants of forecast accuracy and not forecast bias. Moreover, most studies only look at the first year; therefore absolute forecast error for the first year is the main focus of this study.

3.3 Evaluation of Study

In order to create a high quality research the reliability and validity of the study has to be ensured. It is also important to stress what elements of relevance to the topic that has been excluded from the study.

3.3.1 Validity

One of the main concerns in research quality is how well the study measures what it is set out to measure. The purpose is to give a reasonable view of reality without systematic errors. High validity implies that the design of the study generates a result that answers the research questions.

The conclusion validity is high which implies that the conclusions drawn from the study are justified. This is a consequence of using a commonly established measurements and statistical methods, and including almost the entire population in the data sample.

The internal validity estimates whether conclusions on causality can be drawn from the study. Since the study uses data that are static it is sheltered from many causes of internal validity. There are no specific events that can temper with the data; the data will not change with time; testing the data does not impact the data; there is no selection bias since almost the whole population is included; et cetera. However, changing measurements will affect the data since different measurements create different results. To mediate this validity problem the results of all measurements are presented. The construct validity can viewed as high since forecast errors are a good construct for earnings forecast accuracy. Moreover, the variables included in the regression analysis are quite straight forward, e.g. number of years is a good construct for age. The exception is changes in economy where it can be discussed if a change in GDP growth is a good construct. Moreover, if the variables violate the assumptions that regression analysis is based upon, then this will hamper the overall validity of those results.

The external validity is not very high, the South African alternative exchange is quite unique in an international perspective, and as such the generalisation of the conclusions should be limited. However, it could be argued that the results could be generalised to other emerging markets' alternative share markets.

3.3.2 Reliability

The reliability of this study is high. If the study was repeated with the same measurements and the same population the results are likely to be the same. The data used are published financial figures and adjustments have been made to a very limited extent. The main potential problem is the quality of the data provided by external data providers. To mediate this problem random

data checks have been performed and no errors were detected. Another potential problem is that all data has been entered manually into an excel database. To ensure high reliability all entries have been checked twice. The only manual corrections have been to convert currencies and to scale figures to the same time period.

Lastly, both reliability and validity depends upon the abilities and shortcomings of the researcher. As a way of decreasing that effect most results are presented so the reader can draw his/her own conclusion regarding the quality of the study.

3.3.3 Demarcation

The nature of all academic studies implies exclusion of relevant areas due to time and resource restraints. This study borders on many interesting topics that unfortunately are excluded. One of the areas that could have contributed positively to the analysis is how the type of listing affects earnings forecast accuracy since the AltX has a very high percentage of private placements among the IPOs.

Important to notice is that there is a limitation to compare forecasted earnings to actual earnings without adjusting for extraordinary items. As Lonkani & Firth (2005) correctly comment, that there are no extraordinary items in an earnings forecast, since the extraordinary cannot be expected by definition. However due to data constraints this study has failed to take into account this consideration.

4 Findings and Results

This chapter is structured into three sections. Firstly, there is a statistical description of the sample and data. Secondly, the first research question regarding earnings forecast accuracy and bias is tested. Thirdly, the second research question regarding determinants for earnings forecast accuracy is tested with non-parametrical tests and regression analyses.

4.1 Descriptive Statistics

There are three nominal variables which are best described through frequencies tables. The majority of the companies are listed before 2008 (89.6%), are not in the construction industry (68.7%), and are not audited by a final four company (80.6%).

Table 4 Descriptive statistics of independent variables (nominal)

	Frequency	Percent	Valid Percent	Cumulative Percent
2003-2007	60	89.6	89.6	89.6
2008-2009	7	10.4	10.4	100.0
Total	67	100.0	100.0	
Non construction	46	68.7	68.7	68.7
Construction	21	31.3	31.3	100.0
Total	67	100.0	100.0	
Non final four	54	80.6	80.6	80.6
Final four	13	19.4	19.4	100.0
Total	67	100.0	100.0	

Moreover, the average firm has a leverage of 57%, has been operating for almost 13 years, and turns over ZAR 252 million. The time between the IPO and the outcome of the forecast is on average almost five months, and the absolute change in GDP growth during the first forecasted year is 0.012. For the second year the forecast horizon is on average almost 17 months, and the absolute changes in GDP growth over the two forecasted years is 0.044.

Table 5 Descriptive statistics of independent variables (scale)

	Year	N	Mean	Median	Std. dev.	Min	Max
Leverage	1, 2	67	0.57	0.47	0.49	0.03	3.66
Age of firm	1, 2	67	12.94	6.00	17.87	0	96
Size of firm	1, 2	67	252 984	171 370	316 307	-23 571	1 873 108

Forecast horizon	1	67	4.84	4.83	3.55	-2.93	11.90
	2	67	16.84	16.83	3.55	9.06	23.9
Changes in economy	1	67	0.012	0.014	0.007	0.000	0.044
	2	64	0.044	0.058	0.026	0.000	0.073

Outliers

One observation has been removed due to status as both an outlier and influencer. The observation has a great impact on the mean forecast error and consequently the regression analysis since the mean makes up the dependent variable, i.e. absolute forecast error after tax. The value of the observation is less than half the size of the next minimum value. There are good reasons for the removal of the outlier. The size of the observation is a result of the problem mentioned in the section on how to measure forecast error. Very large errors can be recorded if the denominator is small in size. This is exactly what has happened for this observation.

4.2 Test of Earnings Forecast Accuracy and Bias

Table 6 Descriptive statistics of FE, AFE, and SQFE for both years

Measurement		Year	N	Mean	Median	Std. dev.	Min	Max
Forecast error	Profit after tax	1	67	0.061	0.036	0.778	-1.303	3.198
		2	58	-0.336	-0.130	1.252	-4.052	5.576
	Profit before tax	1	65	-0.053	0.010	0.449	-1.244	1.670
		2	58	-0.475	-0.225	1.661	-8.511	6.314
	Revenue	1	67	-0.074	-0.035	0.235	-0.696	0.4243
		2	59	0.088	0.061	0.602	-1.000	2.025
Absolute forecast error	Profit after tax	1	67	0.434	0.219	0.646	0.001	3.198
		2	59	1.030	0.625	1.719	0.006	11.749
	Profit before tax	1	65	0.297	0.173	0.340	0.000	1.670
		2	58	0.975	0.691	1.421	0.006	8.511
	Revenue	1	67	0.171	0.094	0.177	0.002	0.696
		2	59	0.449	0.354	0.406	0.004	2.025
Squared forecast error	Profit after tax	1	67	0.600	0.048	1.831	0.000	10.225
		2	59	3.965	0.391	18.349	0.000	138.037

Profit	1	65	0.202	0.030	0.441	0.000	2.788
before tax	2	58	2.936	0.477	10.816	0.000	72.442
Revenue	1	67	0.060	0.009	0.110	0.000	0.4846
	2	59	0.364	0.125	0.693	0.000	4.100

Forecast Bias for Year One

The average earnings forecast bias, measured as profit after tax, for year one is 6.61% (see table 6). This implies that the management in their forecast underestimate the actual earnings by 6.61%. The bias is therefore pessimistic. Looking at earnings forecast errors for revenue and profit before tax for year one reveals a slight overestimation by 7.4% and 5.3% respectively, an optimistic bias.

The result for the AltX, 6.6%, is close to the average of the meta-study (see compilation in table 1) where the forecast bias in previous studies ranges from -147.2% to 112% but with an adjusted average of 5.6%.

Forecast Bias for Year Two

For the second year the forecast error for profit after tax is -33.6% implying that the forecast overestimates the future earnings by a third. For profit before tax the optimistic bias is even larger at -47.5%. For revenue it is a pessimistic bias at 8.8%. The bias for the second year is much larger than the bias for the first year. This indicates that it is harder to correctly forecast the second year than the first year, and that management are too optimistic about the second year overall. The standard deviation for the bias measurement for the second year is much larger, i.e. the variability around the mean is greater. With a greater standard deviation variability, and also smaller minimum values and larger maximum values, it is clear that the bias regardless of if it is pessimistic or optimistic is larger for the second year. There are no direct comparable studies for year two forecasts. However looking at year one figures in previous studies show that it is the fifth largest overestimation out of the 25 studies with forecasted earnings as denominator, but it is important not to read too much into the comparison since this is an unique second year forecast.

Forecast Accuracy for Year One

The earnings forecast accuracy, for profit after tax, is 43.4%. The accuracy for profit before tax is much better at 29.7% and the accuracy for revenue is even better at 17.1%. The squared forecast accuracy that gives more weight to large errors is 60.0%, 20.2% and 6.0% respectively for profit after tax, profit before tax and revenue. These findings indicate that it is easier to accurately estimate revenue than earnings, and earnings before tax than earnings after tax. This makes sense since there are more assumptions that have to be made further down the income statement. Profit implies getting the estimation of income and cost right, while revenue just requires a good estimation of income. Examining previous studies (see table 1) it is clear that the AltX companies provide a fairly accurate earnings forecast. The adjusted average among the 19 identified AFE studies is 78.1%. Do note that some of the previous studies, see for example (Sun & Liu, 2009), examines AFE for profit before tax which, shown by this study, tend to be more accurate.

This size of AFE ranks 11 among the 18 examined studies. The AltX is performing better than Australia (Hartnett, 1993), New Zealand (Firth & Smith, 1992a) and (Mak, 1989), Jordan (El-Rajabi & Gunasekaran, 2006), France (Citron, Cressy & Gerard, 2009), two Canadian studies (Clarkson, 2000) (Pedwell, Warsame & Neu, 1994) and one Malaysian study (Jelic, Saadouni & Briston, 1998).

Forecast Accuracy for Year Two

Analysing the accuracy measurements for the second year depicts poor accuracy. For profit after tax the absolute forecast error is 103%, for profit before tax it is 97.5%, and for revenue it is 44.9%. The same figures for squared forecast errors are 396.5%, 293.6%, and 36.4% respectively. Again there is a greater level of accuracy for the revenue forecast than for the earnings forecast. There is also a higher level of accuracy for the profit before tax forecast than for profit after tax. In conclusion, accuracy has deteriorated from the first year.

Regarding the squared forecast error they mirror the conclusions made for forecast errors. Moreover, SQFE after tax for year one (320%) and year two (558%) are both smaller than the three previous studies that examined this issue. In Malaysia SQFE amounted to 1373.7% (Jelic, Saadouni & Briston, 1998), in Greece 3044% (Gounopoulos) and in New Zealand the value was 19.100% (Firth & Smith, 1992a). This is a very large difference indicating that the size of the AltX firms' errors is not comparatively large.

The rest of the analysis of forecast bias will only include the measurements for forecast errors (FE). This is to make the burden lighter for the reader and also because there are not many reference points for specific analysis of AFE and SQFE in previous studies, see for example (Sun & Liu, 2009) and (Jaggi and others, 2006).

Pessimistic versus optimistic forecast bias

There are more pessimistic (56.7%) than optimistic forecasts for earnings, profit after tax, for the first year (see table 7). The same goes for profit before tax (52.3%). This is not true for revenue (41.8%). During the second year there are more optimistic (62.1%) than pessimistic forecasts for profit after tax. This is also true for profit before tax (65.5%), but not for revenue (42.4%). The results for year two are diametrically opposed to the ones for year one. Comparing it to the Chinese (50.59% pessimistic) and Taiwanese findings (33.1% pessimistic) this indicates that AltX companies are slightly more pessimistic (Sun & Liu, 2009) (Jaggi and others, 2006).

Table 7 Descriptive statistics of optimistic and pessimistic forecasts for both years

Measurement	Year	N	Optimists		Pessimist	
			Count	Percent	Count	Percent
Forecast error	Profit after tax	1	29	43.3%	38	56.7%
		2	36	62.1%	22	37.9%
	Profit before tax	1	31	47.7%	34	52.3%
		2	38	65.5%	20	34.5%
	Revenue	1	39	58.2%	28	41.8%
		2	25	42.4%	34	57.6%

Small versus Large Forecast Bias Ranges

35.8% of sampled companies are within the +/-10% range for forecast error for profit after tax (see table 8). This increases to 38.5% for profit before tax, and to 57.6% for revenue. The same pattern materialises where revenue has less forecast bias than earnings, and profit before tax is less biased than profit before tax. The same is also true for extremely large forecast error bias greater than 100%. It decreases from 11.9% for profit before tax to 6.2% for profit before tax down to 0.0% for revenue.

The second year has less companies within the $\pm 10\%$ range (12.1%, 10.3%, 15.3%) and more companies outside the extreme $\pm 100\%$ range (29.3%, 31.0%, 8.5%). The relationship between forecast error and the income statement line is not obvious for the second year.

Comparing the results from the first forecasted year (35.8%) with findings from other studies there is no great difference. It is slightly worse than the percentage found in China 55% (Sun & Liu, 2009), Canada 41% ((Clarkson, Dontoh & Sefcik, 1989), Malaysia 46% (Jelic, Saadouni & Briston, 1998) and 48% (El-Rajabi & Gunasekaran, 2006), and Singapore 60% (Firth and others, 1995). But it is also a lot better than Australia 8% (Hartnett, 1993) and Jordan 5% (El-Rajabi & Gunasekaran, 2006); and slightly better than another Singapore study 33% (Tan, 1987).

For extreme values outside the $\pm 100\%$ range the AltX result of 11.9% is larger than China's 0.5% (Sun & Liu, 2009), but smaller than Jordan's 39% (El-Rajabi & Gunasekaran, 2006) and Australia's 53% (Hartnett, 1993).

Table 8 Descriptive statistics of forecast errors within the $\pm 10\%$ range and outside of the $\pm 100\%$ range for both years

Measurement	Year	N	FE within $\pm 10\%$ range		FE larger/smaller than 100%	
			Count	Percent	Count	Percent
Forecast error	Profit after tax	1	24	35.8%	8	11.9%
		2	7	12.1%	17	29.3%
	Profit before tax	1	25	38.5%	4	6.2%
		2	6	10.3%	18	31.0%
	Revenue	1	34	57.6%	0	0.0%
		2	9	15.3%	5	8.5%

4.3 Test of Determinants of Earnings Forecast Accuracy

The determinants of earnings forecast bias will be tested in two regression analyses, one for year one and one for year two. The dependent variable is absolute forecast error (AFE) for profit after tax.

Linear regression sets out to model the reality. In the quest to simplify the complexities of reality the model relies on four assumptions:

1. The error distribution has to be *normally distributed*
2. The relationship between the independent and the dependent variables has to be *linear*
3. The errors need to be *independent* and not serially correlated
4. There errors has to be in constant variance, i.e. *homoscedasticity*

If the variables are normally distributed, then the errors are normally distributed too (Fidell, 1989). The variables are, with one exception, not normally distributed; instead they are skewed and kurtotic. The sole variable that does not violate the rule of normal distribution is forecast horizon. Moreover, the distribution of the errors is not quite normally distributed. This can be seen in a plot of residuals set as a histogram where the residuals are unevenly curved around the line of best fit, instead of being close to the line. This can also be observed in the scatter plot of residuals where instead of an even spread there is a concentrated pattern (see appendix 2). This has implications for the results. The observations are fitted to the regression line, but they are not symmetric to the line i.e. there are systematic errors. The validity of the model is limited.

A rule of thumb when it comes to regression analysis is to have more cases than individual variables. This is especially true in the analysis of small samples. Preferably there should be 20 times as many cases as independent variables; however the minimum requirement is five times (Fidell, 1989). With eight independent variables this study is required to have at least 40 cases, but optimally should have 160. There are 67 cases which is sufficient to perform a regression analysis.

4.3.1 Parametric and Non-Parametric Test of Binary Variables

The binary variables are first tested in a t-test. This is a parametric test that tests two categories against each other through the testing of a hypothesis. The null hypothesis states that there is no difference between the categories, i.e. there is equality of means, in the dependent variable. Rejection of the null hypothesis implies that there is a difference. AFE for construction companies is tested against AFE for non-construction companies. The null hypothesis is rejected for year one but not for year two i.e. the forecast earnings accuracy is higher for construction companies than for non-construction companies for the first forecast year. This is confirmed by a non-parametric test (Mann-Whitney U value of 259 and Wilcoxon W value of 490) with significance level of 1%.

The t-test for final four and non-final four companies shows that there is equality of means, i.e. there is no difference of earnings forecast accuracy between the two groups. However, the more relaxed non-parametric test recognises a difference (Mann-Whitney U value of 431 and Wilcoxon W value of 522). On a 5% statistical significance level it can be concluded that the earnings forecast accuracy for second forecasted year is lower for final four audited companies than for non-final four audited companies.

The t-test for companies listed 2003-2007 or +2008 shows that the null hypothesis cannot be rejected; there is no difference between the two groups. Nonetheless, the non-parametric test identifies a difference at a 5% statistical significance level (Mann-Whitney U value of 309 and Wilcoxon W value of 337). The accuracy for the first forecasted year is higher for companies listed 2003-2007 than for companies listed +2008.

4.3.2 Regression of Earnings Forecast Accuracy for Year One

The first regression is for earnings forecast accuracy for the first forecasted year. The dependent variable is absolute forecast error (AFE) for profit after tax. The predictors are listing before or after year 2008, size of firm, age of firm, leverage, forecast horizon, industry, final four, changes in economy, and a constant.

Firstly a correlation analysis is performed to determine if there is multi collinearity between the independent variables, and to see how strong the connection is between the independent variables and the dependent variable, and among the independent variables. Pearson's correlation matrix (see table 9) suggest that there are correlations between several of the variables. However the strength of the relationships are all smaller than 0.5; therefore there is no problem with multicollinearity among the variables. This is further confirmed with a tolerance and variance inflation factor (VIF) test. The tolerances are between 0.5-0.9 which is way above the risk level at 0.20. Moreover the VIF values are between 1.1-1.8, which is also far from the risk value of 10 and above.

Table 9 Pearson Correlations Matrix

	AFE 1	LEVER	AGE	SIZE	HORIZ	ECON	FOUR	INDU	YEAR
AFE 1									
LEVER	0.447**								
AGE	-0.090	-0.103							
SIZE	-0.096	0.054	0.226*						
HORIZ	-0.205*	-0.076	0.059	-0.013					
ECON	-0.147	-0.116	0.089	0.112	-0.107				
FOUR	0.204*	-0.043	-0.215*	-0.238*	-0.305**	0.207*			
INDU	-0.302**	-0.164	0.420**	0.137	0.084	0.068	-0.250*		
YEAR	0.403**	0.337**	-0.128	-0.099	-0.396**	0.232*	0.449**	-0.231*	

Table 10 shows the results of the regression analysis. The coefficient shows direction and size of the independent variables, and the t-test examines the statistical significance of each variable.

There is a strong positive relationship between earnings forecast accuracy and leverage. The relationship is statistically significant on a 1% level. This implies that the higher the gearing the higher the forecast errors, i.e. companies with a lower leverage have a higher earnings forecast accuracy.

Age has an unexpected positive sign indicating that older companies have larger absolute forecast errors i.e. lower forecast accuracy. Forecast horizon has an unexpected negative sign hinting that a shorter forecast horizon implies lower forecast accuracy. The variable change in economy also has an unexpected sign indicating that more change in the economy gives a larger accuracy. Also, unexpectedly, having a final four company as the auditor, decreases forecast accuracy. These relationships are however very weak and statistically not significant.

Size has an expected a negative direction, the larger the companies the higher the forecast accuracy. Also industry has the expected direction, construction companies are more accurate. Moreover, listing during or after 2008 expectedly has a positive impact on forecast errors and therefore a negative impact on earnings forecast accuracy. Please note that these relationships are not statistically significant, and in the case of size also diminishingly weak.

Table 10 Coefficients

Regression model	Unstandardised Coefficients		Standardised Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
Constant	.415	.218		1.898	.063		
LEVER	.439	.158	.330	2.771	.008	.787	1.270
AGE	.004	.004	.104	.872	.387	.781	1.280
SIZE	-9.503E-8	.000	-.047	-.412	.682	.875	1.143
HORIZ	-.013	.021	-.071	-.606	.547	.814	1.229
ECON	-15.630	.9.937	-.180	-1.573	.121	.854	1.172
FOUR	.153	.210	.095	.729	.469	.664	1.505
INDU	-.264	.167	-.191	-1.584	.119	.768	1.302
YEAR	.478	.292	.228	1.636	.107	.575	1.738

The coefficient of determination, R^2 , is computed to see how well the regression model can predict forecast errors i.e. how well the model fit the observations (see table 11). For this regression model the R^2 is 0.352 and the adjusted R^2 is 0.263. Due to the partial violation of the regression assumptions the adjusted R^2 is examined instead of R^2 . Conclusively, 23.3% of the variability in the data set for absolute forecast errors is determined by the eight independent variables. The Durbin-Watson test indicates that there is almost no autocorrelation in the residuals. Comparing to previous studies the adjusted R^2 is relatively high. In China the regression models have an adjusted R^2 that fluctuates between 5.86% (Sun & Liu, 2009) and 60% (Chen & Firth, 1999). In Citron, Cressy & Gerard (2009) study the adjusted R^2 is varying from 14 to 33%. In Malaysia the span is 11.5-14.4% (Jelic, Saadouni & Briston, 1998). The lowest adjusted R^2 are measured in Greece 6% (Gounopoulos), Hong Kong 1.6% (Chen, Firth & Krishnan, 2001) and Thailand 2% (Lonkani & Firth, 2005). The highest adjusted R^2 is for the Jordanian regression model, 37.2% (El-Rajabi & Gunasekaran, 2006).

The R^2 of 35.2% is comparatively high. The R^2 for previous studies are in decreasing order: 5% Hong Kong (Jaggi, 1997), 9.6% Greece (Gounopoulos), 14.8% Hong Kong (Chan and others, 1996), 17.9-20.1% Malaysia (Jelic, Saadouni & Briston, 1998), 21.9% New Zealand (Firth & Smith, 1992a), and 51.3% Jordan (El-Rajabi & Gunasekaran, 2006).

Table 11 Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
0.594	0.352	0.263	0.555	2.023

The ANOVA analysis (see table 12) tests whether the model provides more information of the dependent variable given access to the independent variables. The null hypothesis states that having the independent variables gives no additional information of the dependent variable. The null hypothesis is rejected. The F-test determines the overall fit of the model and the regression model with its variables is concluded to have a significantly better fit than a no variable models.

Table 12 ANOVA Analysis

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	9.719	8	1.215	3.946	0.001
Residual	17.858	58	0.308		
Total	27.577	66			

4.3.3 Regression of Earnings Forecast Accuracy for Year Two

The second regression is for earnings forecast accuracy for the second forecasted year. The dependent variable is also absolute forecast error (AFE) for profit after tax. The predictors are: listing before or after year 2008, size of firm, age of firm, leverage, forecast horizon, industry, final four, changes in economy, and a constant. Adjustments have been made to forecast horizon and changes in economy to make the input to the regression relevant for the second year.

Pearson's' correlation matrix (see table 13) suggest that there are correlations between among eight of the variables, but there is no multicollinearity among the variables. The tolerances test (0.6-0.9) and VIF test (1.1-1.5) further confirms this.

Table 13 Pearson Correlations Matrix

	AFE 2	LEVER	AGE	SIZE	HORIZ	ECON	FOUR	INDU	YEAR
AFE 2									
LEVER	0.320**								
AGE	-0.144	-0.092							
SIZE	-0.190	0.224*	0.187						
HORIZ	0.021	0.143	0.013	-0.071					
ECON	-0.226*	-0.201	0.084	0.235*	0.270*				

FOUR	0.191	0,044	-0.173	-0.172	-0.240*	-0.152		
INDU	-0.105	-0.173	0.395**	0.077	0.054	0.229*	-0.197	
YEAR	-0.033	0.198	0.003	0.128	-0.341**	-0.091	0.198	-0.142

Leverage is the sole variable with a statistical significant impact on the regression (see table 14). The larger the leverage, the higher the absolute forecast errors, and the lower the earnings forecast accuracy.

Age of company and size of company have the expected direction of influence. The other variables; forecast horizon, changes in economy, final four auditor, construction industry, and flotation before or after 2008; have an unexpected direction of influence. However, these are all statistically insignificant.

Interesting to note is that two variables have changed the direction of influence from the findings of year one. Age has shifted from a positive to a negative influence, and industry has change from a negative to positive direction. The earnings forecast accuracy is higher for construction companies for the first year but not the second. This finding is also confirmed by the non parametric tests.

Tabel 14 Coefficients

Regression model	Unstandardised Coefficients		Standardised Coefficients Beta	t	Sig.	Collinearity Statistics	
	B	Std. Error				Tolerance	VIF
Constant	0.774	1.332		0.581	0.564		
LEVER	2.245	0.843	0.374	2.545	0.014	0.745	1.343
AGE	-0.005	0.013	-0.049	-0.344	0.732	0.800	1.249
SIZE	-1.106E-6	0.000	-0.210	-1.449	0.154	0.763	1.311
HORIZ	-0.018	0.080	-0.035	-0.228	0.821	0.696	1.436
ECON	-5.749	10.155	-0.084	-0.566	0.574	0.738	1.355
FOUR	0.688	0.684	0.138	1.005	0.320	0.852	1.174
INDU	0.093	0.515	0.026	0.180	0.858	0.774	1.292
YEAR	-1.161	1.341	-0,123	-0.866	0.391	0.792	1.262

This regression analysis has lower explanatory power than the model for year one. The adjusted R^2 is 8.4% (see table 15). The independent variables regression model has low prediction ability for the dependent variable.

Table 15 Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
0.461	0.213	0.084	1.658	2.095

The ANOVA analysis (see table 16) states that the null hypothesis is not rejected. This implies that the independent variables give no additional information of the dependent variable. Therefore this regression analysis, and its results, is of very limited value.

Table 16 ANOVA Analysis

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	36.412	8	4.551	1.655	0.134
Residual	134.781	49	2.751		
Total	171.193	57			

In addition to the two above regression analysis four other regressions have been undertaken. The analyses test different coding of the independent variable YEAR. The first test explores whether listing in a hot or cold period affects the earnings forecast accuracy. The results show that the variable was not statistically significant for neither year one nor year two. YEAR is also tested as a continuous variable to see if the accuracy has increased or decreased since the listing. The results show that even in this analysis YEAR is not a statistically significant determinant of earnings forecast accuracy.

5 Conclusions

This chapter begins with a summary of the answers to the two research questions. This chapter also includes recommendations for future academic studies and for possible improvements at the AltX.

What is the earnings forecast accuracy, and bias, for AltX listed companies?

The result shows that firms slightly underestimate the earnings (FE) for the first year by 6.61% and overestimate the earnings by 33.6% for the second year. The accuracy of the forecasts (AFE) is 43.4% for the first year and 103% for the second year. In relation to international studies, the results for the first year are reasonably accurate.

What are the determinants of earnings forecast accuracy for AltX listed companies?

The regression model for the first year shows that leverage is a significant variable (see table 17). The higher the IPO firm is leveraged the lower the earnings forecast accuracy. This finding solidifies the reasoning that a high degree of leverage increases the earnings volatility which makes it harder to predict future earnings. This was previously proven by Eddy & Seifert (1992) and Sun & Liu (2009).

The model for the first year is accepted as having a higher predictive value than a no variables model. The same is not true for the regression analysis for year two that is rejected. Therefore the conclusions focus on the regression analysis of the first year.

Table 17 Summary of Findings for the Regression for Year One

	Independent variables	Expected direction of influence	Actual direction of influence	Findings
HORIZ	Forecast horizon	+	-	i.c.
SIZE	Size of firm	-	-	i.c.
LEVER	Financial leverage	+	+	√
ECON	Changes in economy	+	-	i.c.
FOUR	Final four auditing firm	-	+	i.c.
AGE	Age of company	-	+	i.c.
INDU	Construction industry	-	-	i.c.
YEAR	Listing before/after 2008	+	+	i.c.

i.c. = inconclusive findings

√ = statistically significant connection

The other variables display no statistically significant influence. However, comparing the expected direction of influence with the actual indicates that some of the variables are not only of no statistical significance; they also go against the direction of the hypothesis. Forecast horizon was expected to have a positive sign, instead it is negative. This indicates that the longer the horizon the higher forecast accuracy. This may be due to companies not having time to adjust their actual earnings to conform to the forecasted numbers. It can also be a consequence of timing since a one month delay has a larger impact on a six month period than a year.

The unexpected sign for changes in economy translates into: the larger changes in the economy, the more accurate are the earnings forecast. Another unexpected direction is for age of firm where the negative direction implies that younger firms have higher forecast accuracy. Both these findings have no support in academic literature.

Final four auditing firm have a weak negative direction indicating that IPO firms with a final four auditor have a lower accuracy. In the regression analysis this is not statistically significant. However, a non parametric test of the data for the second year shows that this relationship is statistically significant on a 5% level.

Size, industry and listing before or after 2008 have the expected direction of influence, but cannot be proven statistically significant by the regression analysis. However, a non parametric test shows that construction companies are indeed more accurate for year one on a 1% significance level. A non parametric test also shows that the accuracy is higher for the first year for companies listed between 2003 and 2007. This implies that the global financial crisis might have impaired forecast accuracy.

Overall, the model has an adjusted R^2 of 26.3% indicating that the regression model can predict a quarter of the absolute forecast errors. This regression has a good explanatory power compared to similar studies at other securities markets.

Recommendation for Future Academic Studies

Further Examination of Leverage as a Determinant of Earnings Forecast Accuracy

Leverage, that is found to be a significant determinant of earnings forecast accuracy for the AltX, is measured as long term and short term liabilities divided by total assets. This implies that earnings forecast accuracy is affected by an increase of long term debt, short term debt and other liabilities, or both. Consequently, accuracy may be a consequence of high leverage i.e. a high level of long term debt, and/or of financial distress i.e. a high level of short term liabilities. It could be interesting for future studies to further examine this connection.

Analysis of Different Regression Models for Earnings Forecast Accuracy

Another avenue for future research would be to examine different regression models. It is outside of this study's scope, but a few experiments were performed with fewer independent variables. For example, a model created with only three variables (leverage, economy and industry) had a higher predatory value, R^2 , then the two models tested in this study.

Qualitative Analysis of Motivations for Higher Earnings Forecast Accuracy for the AltX

Moreover, this study shows that the AltX, an alternative exchange for high risk companies in an emerging market, displays a high level of accuracy and has a conservative bias even by international standards. This is an area that could be further explored through a qualitative analysis.

For AltX firms there is a litigation risk for companies that fraudulently submit an inaccurate earnings forecast since the directors of the firm sign a liability statement at the time of the listing. Moreover, JSE have a large arsenal of penalties for companies that are in violation of the listing requirements. Penalties range from public criticism, exclusion from managerial positions at listed companies, fines up to ZAR 5 million, suspension of share trading to delisting of the security. There are also consequences for AltX companies that issue an inaccurate, but perhaps not fraudulent forecast. AltX firms that fail to meet their forecast by a margin of 20% are required to issue a trading report to the market. This in turn affects the investors' sentiment and their willingness to hold the share. The tarnished reputation affects the traded price. The influence on share price is likely to be the greatest motivation for managers to increase earnings forecast accuracy. The AltX lock up period ensures that a mediocre share performance economically affects the initial owners. This would be an AltX specific motivation to increase earning forecast accuracy in addition to the more general wish

to ensure future equity funding. Moreover, there is an incentive for IPO firms to protect the reputation of the AltX to ensure the presence of investors. It is possible that the crash of the AltX market capitalisation was an effect of contagion (see figure 2). The AltX is an alternative exchange in an emerging market and is as such a risky investment. Ensuring high earning forecast accuracy decreases the perceived risk.

All the above need further research to firmly establish what motivates the AltX listed IPO firms to increase their earnings forecast accuracy.

Recommendation to the AltX

Investors depend on the information derived from earnings forecasts when making an investment decision (Lonkani & Firth, 2005). The IPO price is compared to the value derived from the earnings forecast and from there the investors decide whether to invest or not (Firth, 1998). Since young and risky firms are unwilling to voluntarily submit an earnings forecast (Shi, Bilson & Powell, 2008), they will have to be forced to do so. The recommendation to the AltX is to keep the submission of earnings forecast mandatory, and to shift from voluntary to compulsory audit review of the earnings forecasts. This has previously proved to be an efficient tool for increasing the accuracy of earnings forecast (Clarkson, 2000).

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Appendix

1 Listing Requirements

Listing requirements	Main Board	AltX
Share capital	R25 million	R2 million
Profit history	3 years	None
Pre-tax profit	R8 million	N/A
Shareholder spread	20%	10%
Number of shareholders	300	100
Sponsor/DA	Sponsor	Designated advisor
Publication in the press	Compulsory	Voluntary
Number of transaction categories	2	2
Special requirements	N/A	Appoint financial directors
Annual listing fee	0.04% of average market capitalisation with a minimum of R26 334 and a maximum of R121 700 (including VAT)	R22 000 (including VAT)
Education requirements	N/A	All directors to attend directors induction programme

2 Residual Analysis

Figure 3 Histogram of Residuals for the First Regression Analysis (AFE year one)

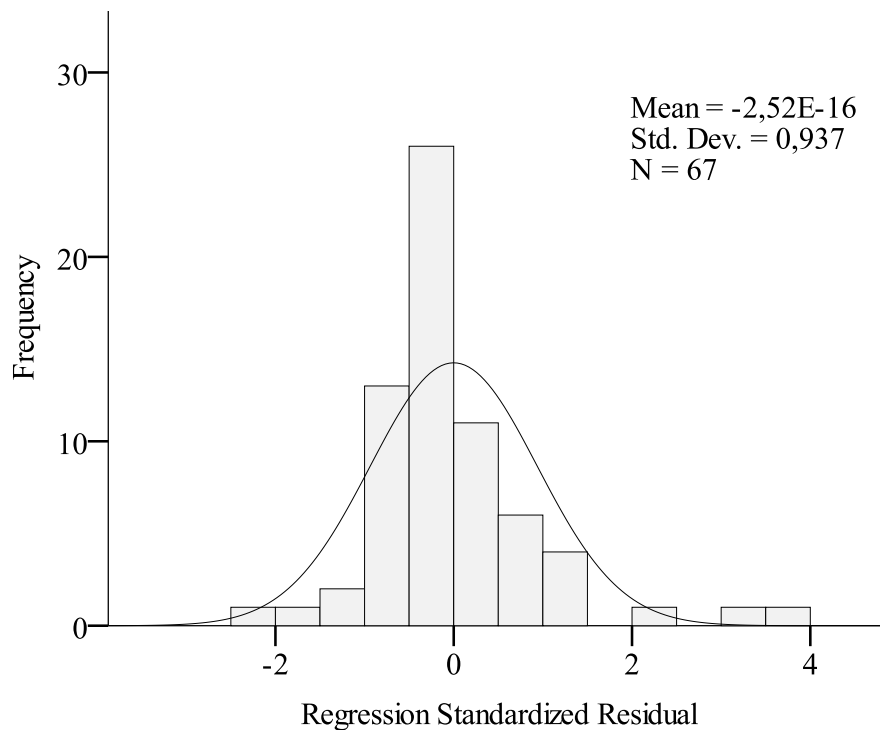


Figure 4 Normal P-P Plot of Regression Standardised Residual for the First Regression Analysis (AFE year one)

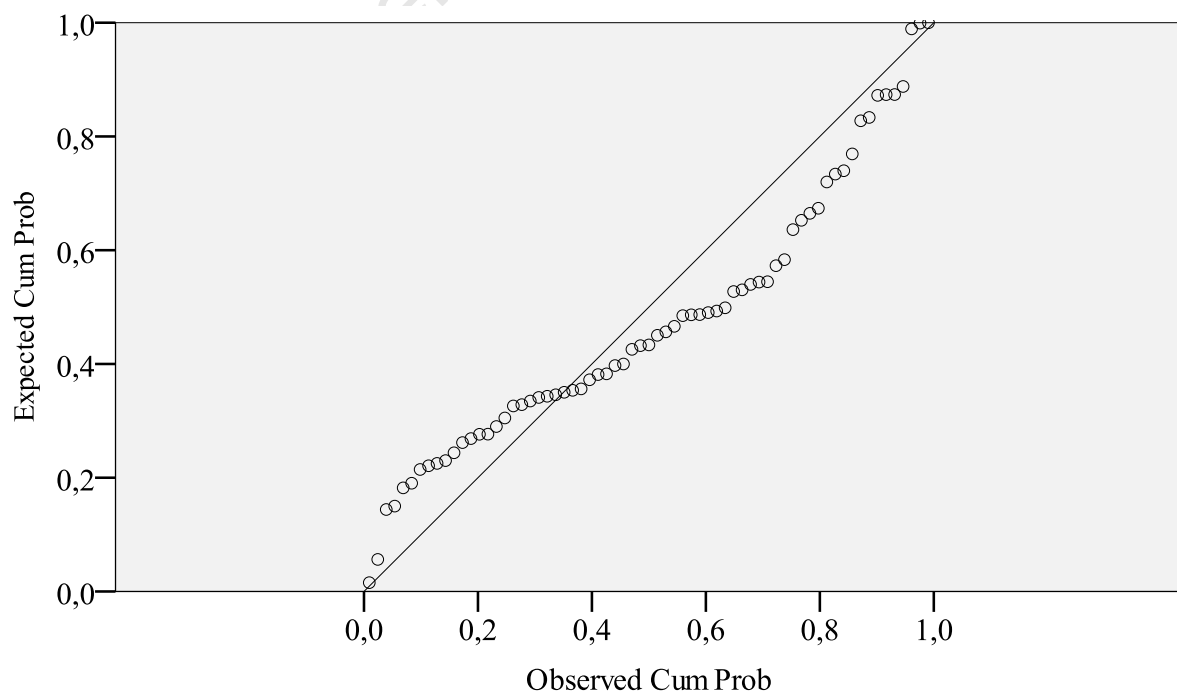


Figure 5 Scatterplot of Residuals for the First Regression Analysis (AFE year one)

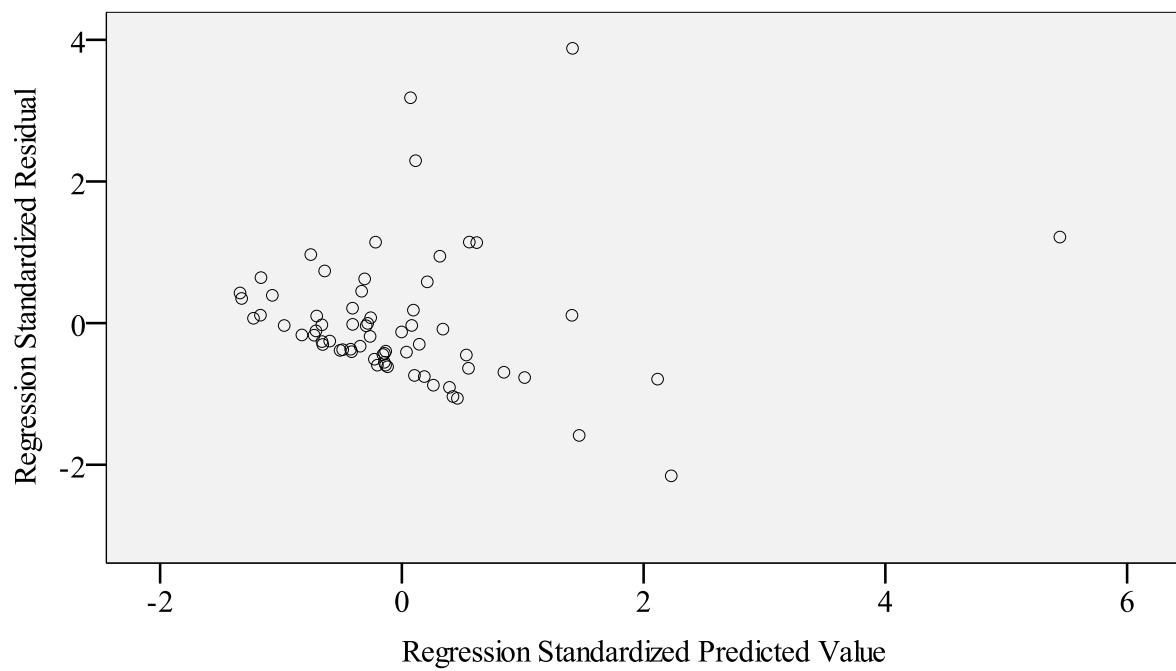


Figure 6 Histogram of Residuals for the First Regression Analysis (AFE year two)

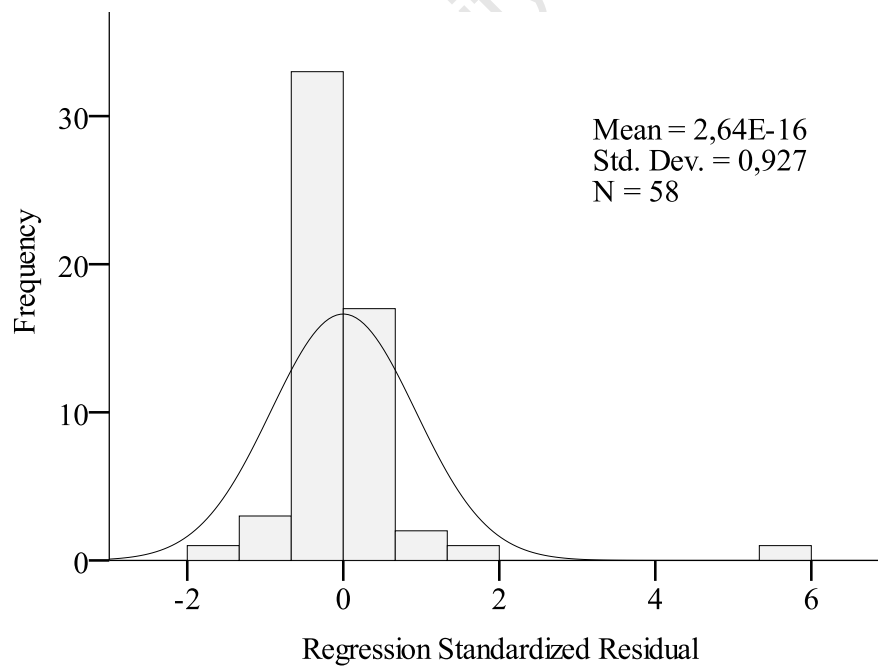


Figure 7 Normal P-P Plot of Regression Standardised Residual for the First Regression Analysis (AFE year two)

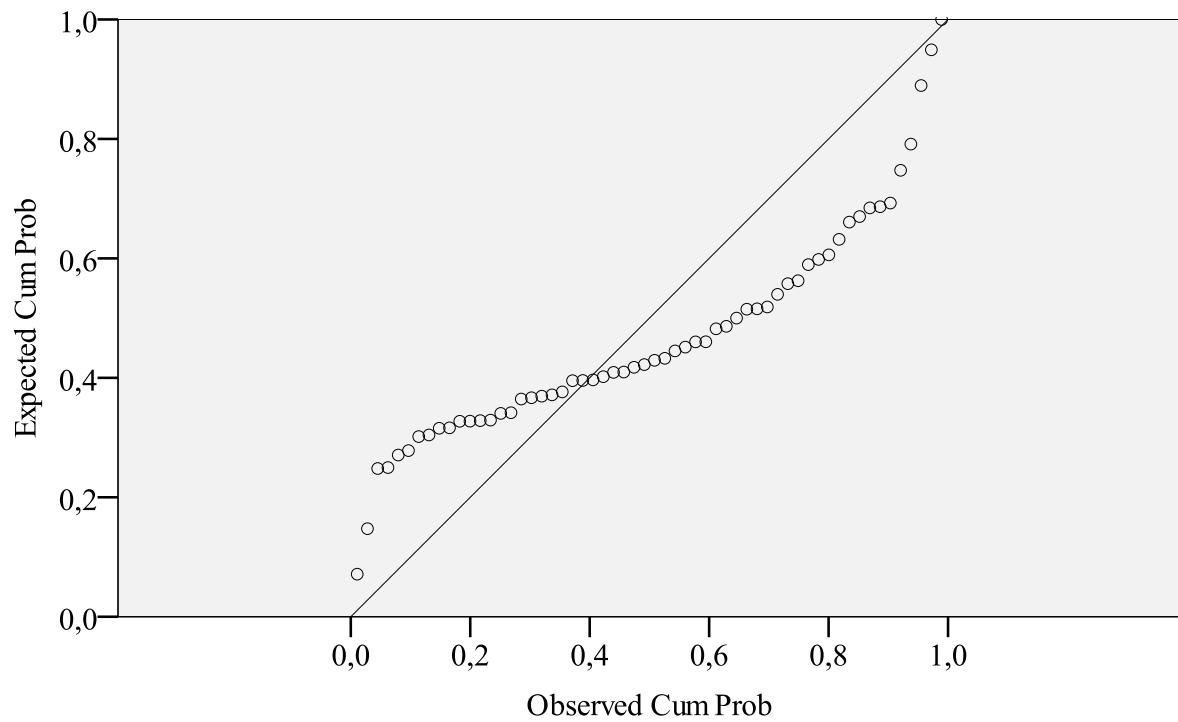


Figure 8 Scatterplot of Residuals for the First Regression Analysis (AFE year two)

